The preparation of the waste assessment has relied on information from multiple sources, including SWAP analysis, reporting of domestic waste data under the licensing requirements of the Waste Management and Minimisation Bylaw 2019, contracts, consents, and annual reports. The accuracy of these sources is contingent on the best information available at the time and the degree of disclosure from the waste industry.

It is not possible to calculate, with precision, up-to-date tonnage and composition of waste being disposed to landfill in the Auckland region without mandatory industry disclosure. Information has also been sought from landfill and refuse transfer station operators, and operators of product stewardship schemes, who have no obligation to supply the requested information. In some instances, information has been voluntarily provided, however on others the requests have been declined to supply information for this purpose.

Financial analysis and modelling have relied on the best financial information available at the time of drafting of the waste assessment.

Auckland Council
Te Kaunihera o Tāmaki Makaurau

Auckland's Waste Assessment 2023

November 2023

Contents

Executive Summary

This waste assessment has been prepared to meet the requirements of the Waste Minimisation Act 2008 (WMA), and to inform the development of the next Waste Management and Minimisation Plan (WMMP). It:

- reviews progress against the 2018 WMMP
- reassesses future demands for collection, recycling, recovery, treatment, and disposal services across the Auckland region
- reassesses goals, objectives and targets to support Auckland Council's aspirational Vision of Zero Waste to Landfill by 2040
- develops and assesses options to meet future demand and achieve desired outcomes for waste minimisation
- reviews options for waste management and minimisation against Auckland Council's (Council's) objectives to determine a preferred option.

While population growth is an important component of planning for waste, this waste assessment considers that the future demand for collection, recycling, recovery, treatment and disposal services within the Auckland region will be driven by a wider range of factors, including:

- An increased emphasis on reducing emissions from waste, which prioritises different waste streams to volume alone.
- An increased emphasis on developing circular systems that involve participation by industries, consumers and council acting together.
- An increased emphasis on actions taken higher up the waste hierarchy such as reuse, product stewardship schemes, packaging design, that potentially alter the volumes and types of waste currently collected by council.

In addition to looking at downstream management solutions for wastes once they are generated, this waste assessment asks the important question which is not "what should we do with the waste once it is generated", but "how can we stem the flow and reduce the high rates of consumption" in order to slow waste generation.

The previous waste assessment and 2018 WMMP introduced the synergies between waste and the reduction of emissions from waste. This waste assessment reflects the increased priority of reducing emissions, now supported by national strategies and legislation. It also aligns with the recently released New Zealand Waste Strategy and the move towards a more circular economy through the Circular Economy and Bioeconomy Strategy.

Progress on the 2018 WMMP targets can be summarised as follows:

Target 1: Total regional waste	
Target	Reduce total council- and private-sector-influenced waste to landfill by 30 per cent by 2027 (from the baseline of 832kg to 582 kg per capita per year)
How we're tracking	**Partly on track** 873kg (increase of 4.9 per cent from the 2010 baseline, however a decrease of 16 per cent since the peak in 2016)
Explanation: While domestic kerbside waste has reduced slightly (refer target below), overall waste quantities including commercial, and construction and demolition waste have increased since the 2010 target was set, however this has started to decrease in recent years.	
Target 2: Domestic waste	
Target	a. Reduce domestic kerbside refuse by 30 per cent by 2021 (from 160kg to 110kg per capita per year). b. After 2021, reduce domestic kerbside refuse by a further 20 per cent by 2028 (from 110kg to 88kg per capita per year)
How we're tracking	 **Partly on track** 141kg (decrease of nearly 12 per cent from the baseline)
Explanation: Domestic kerbside waste has reduced slightly, however due to the delay in the rukenga kai/food scraps collection rollout, there has been a delay in reaching the 2021 target. Food scraps currently comprise about 40 per cent of kerbside waste by weight; and removing those from refuse bins, combined with a reduced frequency for refuse collections, will enable us to reach the target.	
Target 3: Council waste	
Target	a. Reduce council's own in-house office waste by 60 per cent per capita by 2024 (from a 2012 baseline) b. Work across council to set a baseline for operational wastes and, by 2019, put in place targets for reduction.
How we're tracking	 **Partly on track** 44 per cent reduction of in-house office waste in 2019 – noting not assessed during the pandemic. Targets for operational waste not yet established.
Explanation: a) As of 2019, waste from council offices had reduced from the baseline by 44 per cent, however, changes in working behaviour and patterns have necessitated a change in the way this metric is assessed. Comparisons with the historical baseline is challenging. We propose a new baseline and metric be established in the future. b) The approach to set operational waste baselines and targets has not yet been established due to the complexity and breadth of council and CCO activities. Further initiatives are underway to provide across council data on significant operational waste streams.	

Building on the 2018 targets, the future WMMP targets proposed within this assessment are:

Category	Description
In-house	• Reduce office waste by 50 per cent from 0.14kg per visit to 0.07kg by 2030 (from 2022 baseline data).
Domestic kerbside refuse	• Reduce domestic kerbside refuse from a 2022 baseline of 141 kg to 120 kg per capita per year by 2028 (A reduction of 15 per cent).
	• Further reduce domestic kerbside refuse from 120 kg to 100 kg per capita per year (a 17 per cent reduction) by 2030.
Overall reported waste to Class 1 landfill	• Reduce total council- and private-sector-influenced reported waste to Class 1 landfill by 30 per cent from a 2022 baseline of 873kg per capita per year, by 2030.
	• Reduce the tonnage of organics (paper, garden, food) by 100 per cent for food and garden waste, and 50 per cent for paper by 2030, to achieve emissions reductions targets (biogenic methane) from landfill as outlined in the New Zealand Emissions Reduction Plan.

Through the review of current information about waste to landfill and diverted wastes, the following can be concluded:

- There continues to be a significant portion (84 per cent) of the total reported waste going to landfill that is managed by the private sector and not by the council. Information about these waste streams is based on limited data that Council was able to obtain. In addition, there are unknown quantities of soils and rubble going to classes of landfill that have not required reporting until more recently.
- Domestic waste to landfill per capita has been fairly steady since around 2017, however this is anticipated to decline as the kerbside rukenga kai / food scraps service continues to be rolled out through the remainder of 2023.
- The most prevalent types of waste to landfill (current and forecasted) are construction and demolition (C&D)/rubble waste, plastics, timber, and organics.
- Organic waste remains a significant component of commercial and domestic waste to landfill. With its associated greenhouse gas emissions, it is also a focus to help fulfil Auckland's emissions reduction commitments.
- The total annual emissions from landfills are generated by 45 per cent of the total reported tonnes to Class 1 landfills, particularly paper, food and garden waste, timber and textiles.

Based on the quantities and composition of waste and existing resource recovery facilities and services presented in this assessment, Council has identified the following eight priority wastes and waste sources to target within the options assessment.

- Construction and demolition, including soils
- Food production, manufacture, service and consumption
- Packaging (household consumables, kerbside recycling, commercial wastes and the CRS)
- Waste streams identified as national priority products

- Nappies and sanitary products
- Textiles (fashion, uniforms, homewares including carpets)
- Disaster response and recovery
- In-house/operational waste (Council and CCOs), including biosolids

The main reasons these areas have been prioritised over others is:

- They represent a high proportion of waste sent to landfill
- They represent a high proportion of greenhouse gas emissions from waste
- Their volume is increasing and current resource recovery options are limited
- Resource recovery options exist for these materials but the systems are lacking resilience
- They are difficult to recycle or have the potential to cause harm to people or the environment
- There is a need for Council to show leadership with the management of its own waste.

Two options were developed for consideration in this waste assessment, each comprising proposed actions that can be delivered directly by Council and actions that reflect Council's advocacy role, to influence the demand-side of waste services by advocating, facilitating and supporting solutions that reduce waste by taking action higher up in the waste hierarchy. Option 1 is for the full implementation of the 2018 WMMP (status quo). Option 2 is the implementation of Option 1, plus additional actions that target the following key themes:

- Increasing action to maximise diversion from our kerbside waste.
- Accelerate our contribution to Auckland's climate goals by expanding our priorities to include more waste streams that have high carbon emissions.
- Empower and equip Auckland businesses to minimise waste from their operations, with a focus on priority waste streams.
- Significantly expand and accelerate support for the construction industry to minimise waste to landfill.
- Support Auckland's waste infrastructure to remain resilient in the face of climate challenges.
- An increased focus on Auckland Council group operational wastes.
- Broaden our advocacy to central government for timely delivery of the statutory and policy framework that will enable the shift to a circular economy.
- Paving the way for beyond 2030.

Cultural, social, environmental, operational, economic, and risk factors were used to assess the actions put forward under Option 1 and Option 2. The preferred option to guide the next WMMP is Option 2: full implementation of 2018 WMMP, plus enhanced research, business support and advocacy functions. Further refinement and interrogation of specific actions to support Option 2 will be carried out as part of the 2024 WMMP process.

1 Introduction

This waste assessment has been prepared to meet the requirements of Section 51 of the Waste Minimisation Act 2008. It is the third waste assessment conducted by Auckland Council since its formation in 2010. It:

- reviews progress against the 2018 Auckland Waste Management and Minimisation Plan
- reassesses future demands for collection, reuse, recycling, recovery, treatment, and disposal services across the Auckland region
- reconfirms goals, objectives and targets to support the Council's aspirational vision of Zero Waste to Landfill by 2040
- develops and assesses options to meet future demand and achieve desired outcomes for waste minimisation
- reviews options for waste management and minimisation against other council objectives, such as reducing emissions from waste, increasing resilience and moving towards a circular economy.

All territorial authorities in New Zealand are legally required to conduct a waste assessment and consider it in the review and preparation of their WMMP. The Waste Minimisation Act 2008 also requires this assessment be notified with the WMMP when it is drafted for public consultation. A decision on whether to amend or revoke and replace the plan is required within six years of the previous review. In this case, the decision is due by June 2024.

The Council follows a shared decision-making model, increasingly with community partnering. In developing this assessment, early engagement has been sought from:

- mana whenua
- the wider Auckland Council organisation and its CCOs
- private waste and recycling sectors
- the commercial sector and other waste producers
- community partner groups.

The council has direct control over a relatively small portion of the region's waste to landfill, so this collaborative approach is intended to help achieve the WMMP's vision and goals.

The waste assessment has been developed after the release of the Te rautaki para/ New Zealand Waste Strategy (NZWS) in March 2023, and before the release of the proposed legislation to support this strategy. Assumptions have been made (and noted) where the NZWS aligns with Council's objectives and further legislative support is anticipated.

This assessment refers throughout to the previous waste assessment and the current WMMP (and associated background research and issues papers). Assumptions within those earlier documents are tested as required, and any changes in thinking or approach are noted. However, the intent is not to re-litigate or revisit previous bodies of work in their entirety.

The current WMMP is a key element in achieving the Auckland Plan, and was formulated based on extensive stakeholder engagement, and a robust political review and decision-making process.

1.1 What is the purpose of a waste assessment and how is it conducted?

A waste assessment gathers information on levels of waste, existing services, and future needs. This enables the council to determine priorities and identify and assess future options for services with the overall intent of reducing waste to landfill.

As this is the council's third waste assessment, it also reviews progress against the current WMMP and identifies actions to carry over into the next waste planning phase.

A summary review outlines service options and, together with an action plan, forms the basis for discussions with key stakeholder groups, to test and refine the approach prior to inclusion in the WMMP.

This assessment has been reviewed by the Medical Officer of Health, with the outcome of the review and comments received in Appendix L.

A draft WMMP will then be prepared for wider public consultation.

1.2 What does this waste assessment contain?

This waste assessment includes:

- a review of the legislative and strategic context of Auckland Council's waste activities (Chapter 2)
- a review of completed actions and current performance against the 2018 WMMP (Chapter 3)
- analysis of data on waste streams and diverted materials in the region, and any data trends (Chapter 4)
- an inventory of the existing services, and infrastructure and facilities for the whole region, including both publicly and privately operated services (Chapter 5)
- a forecast of future demand for services and factors influencing the demand for future service or the way services may be delivered (Chapter 6)
- a future planning framework (Chapter 7)
- a review of options to meet the region's demands and waste minimisation objectives, and presentation of preferred options developed as a straw man for discussion (Chapters 8, 9)
- preliminary consultation/stakeholder engagement done as part of the waste assessment process (Chapter 10)
- a statement of proposal related to preferred options (Chapter 11)
- a statement of public health protection (Chapter 12).

1.3 Completeness and accuracy

While every effort has been made to make a full and balanced assessment and to achieve a reasonable degree of accuracy in this assessment, Auckland Council's limited ownership of waste infrastructure creates limitations on the level of data availability. Where readily available, actual data has been collated and recorded with data source noted. Where estimates have been used, the basis for those (and any data limitations) has been indicated.

Details regarding any limiting factors in preparing the waste assessment that are deemed to have materially impacted on the completeness or accuracy of the data, forecasts or options assessment are noted where relevant.

The information obtained for completing this waste assessment was considered appropriate when giving regard to:

- significance of the information
- the costs and difficulty in obtaining the information
- the extent of the council's resources
- the possibility that the council may be directed under the Health Act 1956 to provide the services referred to in that Act
- the impact on the completeness of the assessment, particularly the forecast of future demands and options assessed.

In addition, the waste assessment has to describe the impact on the completeness of the assessment, particularly the forecast of future demands and options assessed.

The preparation of the waste assessment has relied on information from multiple sources, including SWAP analysis, reporting of domestic waste data under the licensing requirements of the Solid Waste Bylaw 2019, contracts, consents, and annual reports. The accuracy of these sources is contingent on the best information available at the time and the degree of disclosure from the waste industry.

It is not possible to calculate, with precision, up-to-date tonnage and composition of waste being disposed to landfill in the Auckland region without mandatory industry disclosure. Information has also been sought from landfill and refuse transfer station operators, and operators of product stewardship schemes who have no obligation to supply the requested information. In some instances, information has been voluntarily provided, however on others the requests have been declined to supply information for this purpose.

Financial analysis and modelling has relied on the best financial information available at the time of drafting of the waste assessment.

2 Legislative and strategic context

This chapter outlines key legislation the council must consider in developing its waste assessment and WMMP, as well as the strategic framework in which those documents sit at the local level.

The latter part of the section summarises the implications arising from the legislative and strategic context, along with a summary of Auckland Council's responses (to date and planned) to help address those aspects.

2.1 Te Tiriti o Waitangi

The council recognises te Tiriti o Waitangi (the Treaty of Waitangi) as New Zealand's founding document. Our relationship with and responsibilities to Māori are grounded by this and guided by law.

The 2018 WMMP acknowledged the importance of the Treaty and provided explanations of te ao Māori and Māori Priorities linked to waste outcomes. It is important that these and other aspects of the plan are reviewed with mana whenua to confirm:

- how te Tiriti o Waitangi and te ao Māori are reflected in the next WMMP
- opportunities to strengthen council's partnership approach with iwi; and
- that the plan responds to the Māori Outcomes sought in *Kia Ora Tāmaki Makaurau 2021,* and considers the *Schedule of Issues of Significance 2021-2025* of the Independent Māori Statutory Board.

At the time of writing, work is underway with mana whenua representatives and staff within the council supporting Māori outcomes to review the 2018 WMMP.

2.2 International Commitments

New Zealand is party to the following key international multilateral agreements that impact and influence the requirements of our domestic legislation for waste minimisation and disposal. These include:

- Basel Convention (ratified by NZ in 1994) – aims to reduce the movement of hazardous wastes between nations. Recent amendments were made in 2020 relating mostly to the export of mixed plastics which now require consent from the receiving country before they leave New Zealand.
- Waigani Convention (ratified by NZ in 2000) – linked to the 1989 Basel Convention, this is a regional agreement that bans export of hazardous or radioactive waste to Pacific Island countries or to Antarctica.
- Stockholm Convention (ratified by NZ in 2004) – aims to eliminate or restrict the production and use of persistent organic pollutants (POPs). New Zealand has laws and regulations to tightly control POPs and implement the convention. Together with the Basel Convention, these create the international rules for the transboundary movement and safe management and disposal of some of the most hazardous chemicals and wastes in the world.
- Kigali Amendment to the Montreal Protocol (ratified by NZ in 2016) – to protect the ozone layer by phasing out the production and consumption of numerous substances. The Kigali Amendment is phase down the use of hydroflurocarbons (HFCs) worldwide.

- *Paris Agreement* (ratified by NZ in 2016) – global agreement on climate change.
- *Minamata Convention* – to protect human health and the environment from the harmful effects of exposure to mercury. New Zealand is yet to ratify the convention and the government recently *consulted* on a new set of regulations to do so, strengthening its controls on mercury.

Further, as a member of the United Nations, Aotearoa New Zealand is also currently working with other countries on an International Legally Binding Instrument to End Plastic Pollution (a Global Plastics Treaty). A New Zealand delegation has attended Intergovernmental Negotiating Committee meetings in 2022 and 2023. Negotiations are expected to conclude by the end of 2024.

Auckland Council's work also aligns and supports the achievement of the *United Nations Sustainable Development Goals*, in particular goals 11, 12 and 13 - make cities and human settlements inclusive, safe, resilient and sustainable, ensure sustainable consumption and production patterns, and take urgent action to combat climate change and its impacts. The 17 goals are heavily focused on recognising that poverty reduction is a means of achieving other environmental and social outcomes which Auckland Council has explicitly addressed through its own plans and strategies.

2.3 New Zealand Waste Strategy (Te rautaki para / Waste strategy)

Waste management and minimisation is underpinned by the government's core policy, Te rautaki para / NZ Waste Strategy (NZWS). A new strategy was released in March 2023, replacing the 2010 version. The new strategy includes more prescriptive targets than the 2010 version, something Auckland Council advocated for in its 2017 Waste Assessment as they will help drive change at the local level.

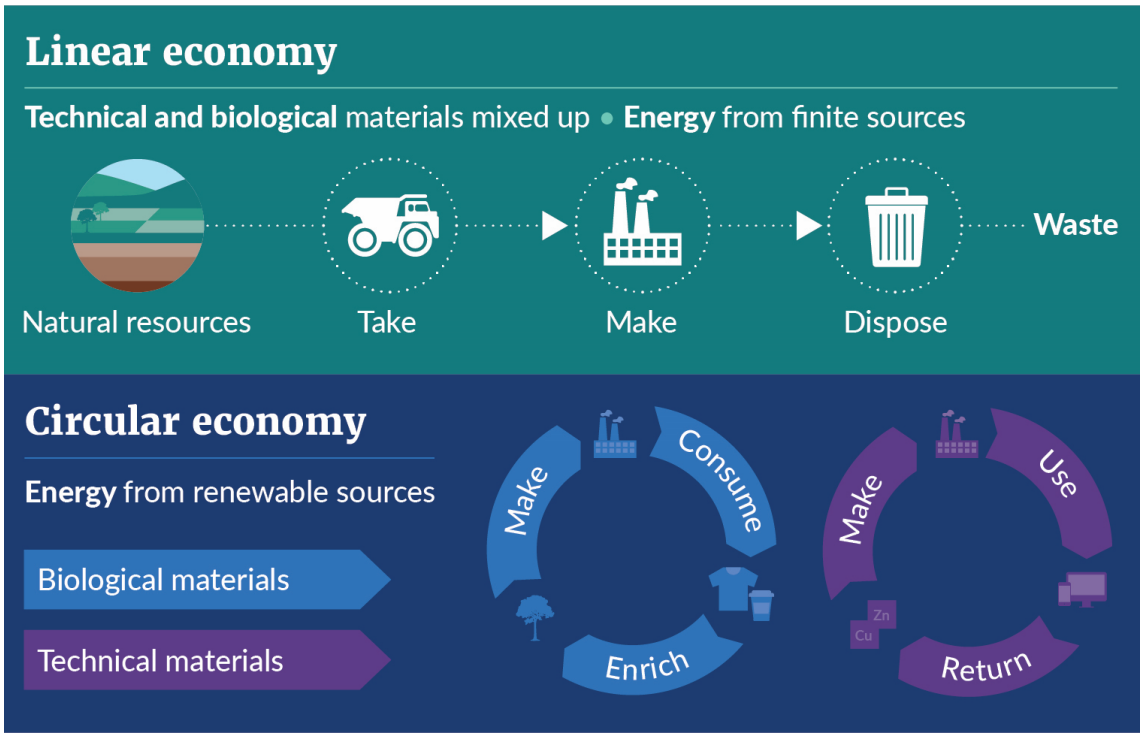
The NZWS sets out the long-term policy priorities for waste management and minimisation and has a vision for 2050:

> *By 2050, New Zealand is a low-emissions, low-waste circular economy.*
>
> *We cherish our inseparable connection with the natural environment and look after the planet's finite resources with care and responsibility.*

2.3.1 Linear and circular economies

In the NZWS, a 'linear economy' is defined as the system of taking natural and often finite resources, making them into something, then using and disposing of them. In contrast, a 'circular economy' is a system where extracted materials are used and reused for as long as possible. For technical or synthetic materials, the ideal scenario is that they are reused forever. Biological (organic) materials are eventually returned to the soil to enrich it. Figure 1 below depicts the characteristics of linear and circular economies and is extracted from the NZWS.

Figure 1 Characteristics of linear and circular economies

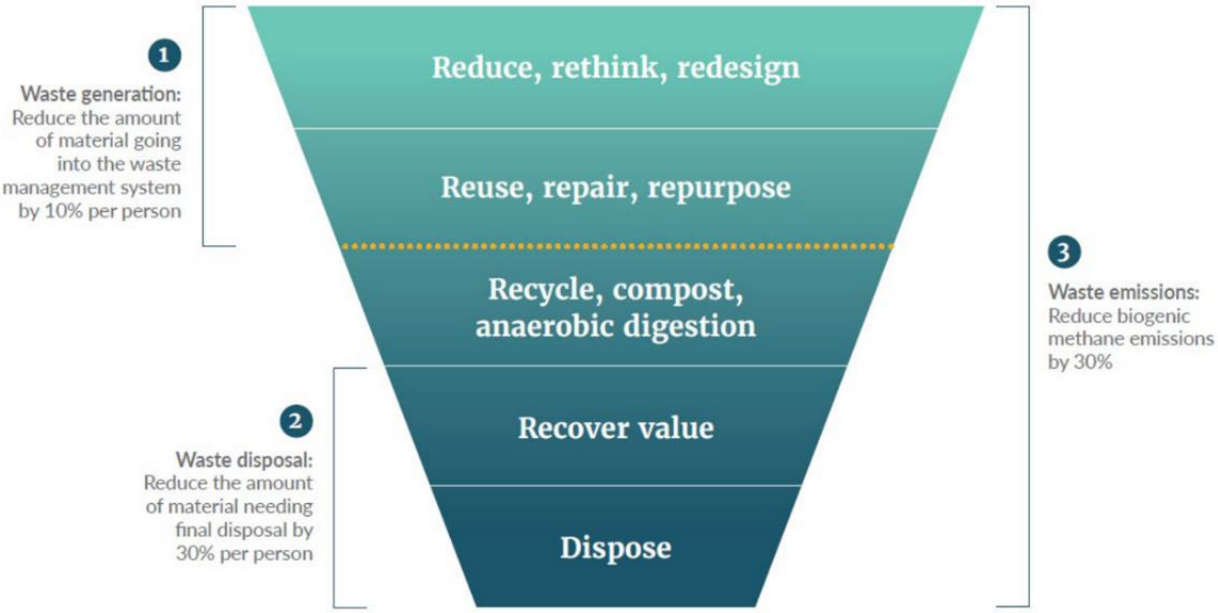


2.3.2 National targets

The NZWS sets three national targets to be achieved by 2030:

- Waste generation: reduce the amount of material entering the waste management system, by 10 per cent per person,
- Waste disposal: reduce the amount of material that needs final disposal, by 30 per cent per person,
- Waste emissions: reduce the biogenic methane emissions from waste, by at least 30 per cent.

Figure 2 Waste hierarchy with targets



2.3.3 National goals

The strategy has the following eight goals:

1. **Systems:**
   The Strategic planning, regulatory, investment and engagement systems are in place and operating to drive and support change
2. **Infrastructure:**
   We have a comprehensive national network of facilities supporting the collection and circular management of products and materials.
3. **Responsibility and accountability:**
   We all take responsibility for how we produce, manage and dispose of things, and are accountable for our actions and their consequences.
4. **Using less:**
   We use fewer products and materials, and using them for longer, by making them more durable, and repairing, reusing, sharing and repurposing them.
5. **Resource recovery systems:**
   Resource recovery systems are operating effectively for core materials and across all regions.
6. **Recovering value:**
   We look for ways to recover any remaining value from residual waste, sustainably and without increasing emissions, before final disposal.
7. **Emissions:**
   Emissions from waste are reducing in line with our domestic and international commitments.
8. **Contaminated land:**
   Contaminated land is sustainably managed and remediated, to reduce waste and emissions and enhance the environment.

2.3.4 Local government actions

The NZWS includes the following actions for local government:

- Get involved in implementing the NZWS and the process to develop an action and investment plan (AIP). Use the NZWS as the starting point for their next WMMP.
- Look for opportunities to work with other councils on new, or expanded, facilities and services that will contribute to a national network for circular management of resources.
- Support local community groups and non-governmental organisations with their initiatives to reduce waste.
- Link with national behaviour change programmes to support and expand the reach of your local activity.
- Make sure that planning and consenting processes take account of the need for waste management infrastructure and services.
- Plan and resource the work needed to identify and manage vulnerable landfills and other contaminated sites.

Section 44 of the Waste Minimisation Act 2008 requires councils to 'have regard to' the NZWS when preparing a WMMP. In this case the council has reviewed the new strategy and considered how best to align the next WMMP. The exception is to outcomes linked to managing vulnerable landfills and contaminated sites, which the council has set aside for the time being so that those are out of scope of the current plan. This is consistent with the approach for the council's current 2018 WMMP; noting that these activities are currently managed through regulatory mechanisms and through separate teams at the council. Once the AIP is developed for the country, it will inform future development of WMMPs. As such, the AIP will inform the 2030 WMMP review for Auckland Council. In the meantime, the government's early investment signals through the Waste Minimisation Fund (WMF) take priority.

2.4 Legislative framework

The following legislation, and the associated regulations and guidelines, impact on the planning and delivery of waste services:

- Waste Minimisation Act 2008 (WMA)
- Litter Act 1979
- Climate Change Response (Emissions Trading Reform) Amendment Act 2020
- Climate Change Response (Zero Carbon) Amendment Act 2019
- Local Government Act 2002 (LGA)
- Natural and Built Environment Act 2023 and Spatial Planning Act 2023 (phasing in over the next 10 years to replace the Resource Management Act 1991).
- Hazardous Substances and New Organisms Act 1996
- Health Act 1956
- Biosecurity Act 1993
- Health and Safety at Work Act 2015
- Building Act 2004

- Civil Defence Emergency Management Act 2002

A summary of the implications of this legislation for Auckland Council's waste services planning and delivery is outlined in Chapter 2.5.

2.4.1 Key changes since 2017

Since the last Waste Assessment was produced in 2017, there has already been a significant shift in the legislative framework that supports the planning and delivery of waste services. Many of these changes were advocated for by Auckland Council. Key changes include:

- The Waste Disposal Levy has been increased and expanded to including all types of landfills. Between July 2021 and July 2024, the levy for Class 1 landfills will have increased from $10/tonne to $60/tonne.
- Expansion of the waste reporting system to include transfer stations.
- Auctioning has been introduced into the New Zealand Emissions Trading Scheme. Landfill operators are required to surrender emissions units on a per tonne of waste disposed basis[1].
- The government has announced six priority products for which regulated product stewardship schemes are now being developed. They have also separately proposed a beverage Container Return Scheme (CRS) for New Zealand although this scheme's implementation was deferred in early 2023.
- Phasing out hard-to-recycle and single-use plastics. Single-use plastic shopping bags were phased out in 2019. In 2022, the Government began implementing a policy to phase-out certain hard-to-recycle and six single-use plastics in three tranches. Tranche 1 (which came into effect in 1 October 2022) included certain PVC food trays and containers, polystyrene takeaway food and beverage packaging, oxo and photo-degradable plastics, plastic drink stirrers and plastic stemmed cotton buds. Tranche 2 (which came into effect in 1 July 2023) included plastic straws, produce bags, tableware (e.g. plastic plates, bowls, cutlery) and non-compostable fruit stickers. Tranche 3 will come into effect from mid-2025 and is intended to include bans on all PVC and polystyrene food and beverage packaging. This is in response to collapse in the international recycling markets for plastics in the late 2010's.[2]
- The standardisation of materials to be collected in council dry recycling from February 2024, food and green waste collections; with a proposal for mandatory diversion targets for councils. By 2030, councils may be required to ensure greater than 50 per cent diversion of waste collected in residential kerbside services. All councils are required collect the standard list of recyclable material and provide food scraps collection services[3]. Council adjusted its kerbside recycling information to match the MfE standard materials in 2023 and is looking to update the Waste Management and Minimisation Bylaw controls to align with this process.
- Ongoing government investment in resource recovery infrastructure through the Waste Minimisation Fund (WMF), Covid Response and Recovery Fund (CRRF, $124M), Climate

[1] Note, the intent of the combined levy and emission charge increases is to create a greater economic incentive for waste generation to be avoided.

[2] Appendix H.2 discusses this change and the impact on Auckland's recyclables end markets in more detail. [Recyclables reuse, processing and end markets issues paper.]

[3] With an earlier deadline of 2027 for instituting food scrap collections where a food scrap processing facility is located nearby

Emergency Response Fund (CERF) and establishment of the Plastics Innovation Fund (PIF, $50M, under the WMF umbrella).

- The Ministry for Business, Innovation and Employment (MBIE) is driving New Zealand's Circular Economy Strategy and the Emissions Reduction Plan; and has procured research into evidence about the impacts, barriers and enablers for a circular economy and bioeconomy in Aotearoa by 2050. The strategy is proposed to be complete in climate budget period one (2022-25).
- The introduction of the Climate Change Response Act Amendments in 2019 and 2020 and consequential publishing of the Government's emissions budgets and Emissions Reduction Plan (ERP).
- The inclusion of waste and resource recovery infrastructure within the "*Rautaki Hanganga o Aotearoa – New Zealand Infrastructure Strategy 2022-2052*" published by the New Zealand Infrastructure Commission.

2.4.2 Further change to come

There are significant changes proposed to the key waste legislation governing waste management in New Zealand, the Waste Minimisation Act 2008 and the Litter Act 1979. The cabinet papers that outline these proposed changes are discussed further in Section 2.2.3.

There is also a significant resource management reform programme underway that has seen the RMA replaced with two new Acts, the Natural and Built Environment Act and the Spatial Planning Act. In addition, changes are proposed to the Building Act 2004 to reflect the government's climate change response commitments, including a mandatory requirement for waste minimisation plans for construction and demolition projects. The LGA is expected to soon undergo review as part of the government's response to the Review into the Future of Local Government.

MBIE will be developing New Zealand's circular economy and bioeconomy strategy. This will be reflected in Industry Transformation Plans for different business sectors, e.g. the advanced manufacturing sector.

The government is currently working on its second ERP to address its second emissions budget. It is also working on its first waste Action and Investment Plan (AIP).

2.4.3 Proposed amendments Waste Minimisation Act 2008 and Litter Act 1979

The purpose of the Waste Minimisation Act 2008 is to encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm; and to provide environmental, social, economic and cultural benefits. Territorial authorities 'must promote effective and efficient waste management and minimisation within their districts'.

The Litter Act 1979 provides councils with powers to create Litter Control Officers who have powers to issue infringement notices with fines for those who litter.

The government recently released four cabinet papers dated March 2023 with proposed changes to waste legislation, and subsequently, a fifth paper dated May 2023 setting out a legislative framework for Extended Producer Responsibility, which would replace the current product stewardship framework in the WMA. The first paper defines how the Waste Minimisation Act 2008 and the Litter Act 1979 are planned to be repealed and replaced with new legislation termed 'Responsibility for Reducing Waste Act', and sets out overarching provisions relating to purpose and principles of the legislation, governance arrangements, the strategic planning and reporting framework, and the allocation and use of waste disposal levy funds. Paper 2 outlines the proposed new approach to product policy, including new or amended regulatory powers to control

products and materials sold in New Zealand to increase circular activity. Paper 3 proposes more comprehensive controls on waste management activities such as resource recovery, recycling, composting and disposal, including proposing a duty of care regime, and a licensing regime including tracking of some wastes.

The aim for the new legislation is to develop clear lines of responsibility between central government and local government and align local and strategic planning frameworks through standard reporting requirements. It will formally require alignment to the NZWS provisions.

It is proposed that MfE would continue to have responsibility for waste policy, sector stewardship, regulatory, EPR scheme, investment and behaviour change. The Environmental Protection Authority (EPA) would take on operational and enforcement functions in the waste sector (waste contract licensing, waste track and trace, collection and distribution of the waste levy, reporting and enforcement of product stewardship schemes). Amendments to the EPA Act 2011 would be required. Customs border control and import-export waste materials may also be affected.

For local government, waste functions will be subject to minimum obligations; refuse, recycling and organics collections through kerbside and other methodologies, setting bylaws, enforcement, education and community engagement.

There will be a requirement for long-term strategy links between national infrastructure and emission reduction plans to the waste sector through the NZWS, Action and Investment Plan (AIP) and territorial authority WMMPs. Centralised and aggregated data, collected by the government, is proposed to be shared with territorial authorities, with territorial authorities then required to evaluate and report on performance to the government.

The requirement for a separate Waste Assessment will be phased out, rather with improved data collection it will be incorporated into WMMPs. The government will be expected to develop a 20-year Waste Strategy, AIP, and review WMMP performance. Where performance against WMMPs and the NZWS is lacking, the Minister will have intervention power through formal direction or setting performance standards. WMMPs will also be subject to five-year minimum reviews instead of the current six-year reviews.

The select committee process is expected to commence in late 2023, with legislation enacted by 2025, and implementation from 2025-2030.

2.5 Strategic framework

In some cases, Auckland Council plans and strategies intersect with the WMMP, with shared objectives and proposed actions, and/or common mechanisms for funding and delivery. Key council plans and strategies that sit alongside the WMMP and waste assessment process are:

- Auckland Plan 2050
- Auckland Unitary Plan 2016 (AUP)
- Te-Taruke-A-Tawhiri: Auckland's Climate Plan
- Auckland Council Group Sustainable Procurement Framework
- Ngā Hapori Momoho: Thriving Communities Strategy 2022-2032
- Civil Defence Emergency Management planning
- Waste Management and Minimisation Bylaw 2019

- Kia ora Tāmaki Makaurau 2021
- Infrastructure Strategy 2021, part of the Long Term Plan 2021 - 2031

In addition, the Independent Māori Statutory Board has published a Schedule of Issues of Significance 2021-2025, a statutory document setting out key issues relevant to Māori of Tāmaki Makaurau / Auckland.

Since the last Waste Assessment was produced in 2017, council's overall strategic framework has developed significantly to respond to key issues such as climate change, Māori outcomes, infrastructure resilience and planning, and social procurement practices. A summary of the implications of the above council strategies and plans that have relevance for waste services planning and delivery is outlined in Table 1.

2.6 Implications for Council's waste planning

The following table summarises the implications of the legislative and strategic framework for waste management and minimisation in Auckland. It also summarises Council's current response.

Table 1 Legislative and strategic framework

Document	Key implications for waste	What Auckland Council is currently doing
National Strategy		
Te rautaki para /Waste strategy (NZWS)	Local government must give regard to the NZWS when preparing Waste Assessments and WMMPs	Auckland Council's existing vision, goals, objectives and targets have considered the strategic direction of the NZWS
Legislation		
Waste Minimisation Act 2008 & Litter Act 1979	Role of Councils to promote efficient and effective waste management and minimisation whether they are the direct service provider or otherwise. Increasing cost of waste disposal at Class 1-4 landfills, due to increased levy. Funds to invest in resource recovery infrastructure, nationally and sub-nationally, and establish a standardised national resource recovery network. Requirement for local government to standardise kerbside services and meet minimum diversion targets. Collection networks to support product stewardship schemes. Expanded national reporting requirements. Enforcement of new waste diversion and litter infringements.	The council promotes effective and efficient waste management and minimisation in the region, noting more than 80 per cent of the region's waste is controlled by the private sector limiting Council to an influence and enable role. It has: •made available kerbside refuse and recycling services across the region; and is rolling out food scraps collections. •continues to expand Auckland's resource recovery network, including Community Recycling Centres. •supports residents and businesses to divert waste from landfill •prevents litter and illegal dumping through behaviour change programmes. •undertakes litter enforcement including issuing warning letters, litter infringements, or prosecuting major offenders. •advocates and supports implementation of national initiatives that will reduce waste in the Auckland region.
Climate Change Response Act 2002, amendments and regulations. **The National Emissions Reduction Plan and National Adaptation Plan**	Increasing cost of waste disposal due to increasing cost to surrender emissions units for disposal of waste at Class 1 landfills. Setting national emissions reduction targets and the need for Council plans to address these. The Emissions Reduction Plan includes actions to reduce emissions from landfills by reducing organic waste disposal and improving landfill gas capture. There are also actions set out in the National Adaptation Plan with relevance to the waste/resource recovery sector relating to managed retreat and strengthening the resilience of infrastructure and services.	The council developed its Low Carbon Action Plan (LCAP), officially launched 1 July 2014. It contained a "bold target of reducing greenhouse gas emissions by 40 per cent by 2040", as well as specific waste targets. A range of waste activities were considered under the LCAP, recognising the implications that waste activities have on carbon emission levels and co-benefits of waste reduction, particularly organic waste and C&D waste. This commitment and the actions to achieve it were updated in 2020 with the launch of Te-Tāruke-Ā-Tāwhiri: Auckland's Climate Plan. Responding to the impacts of climate change (mitigation and adaptation)

Document	Key implications for waste	What Auckland Council is currently doing
		are also incorporated into council's planning processes through the Long Term Plan and Infrastructure Strategy.
Local Government Act 2002	Consider wider economic, social, environmental and cultural impacts in, decision-making processes and delivery of waste management and minimisation services. Follow appropriate consultative procedures when developing the Waste Assessment and WMMP. Review service delivery approach for Council's waste management and minimisation services at least every six years. Changes to the LGA may be introduced as a result of the Review into the Future for Local Government.	•Considers wider community wellbeing when considering options. •Continues to follow appropriate consultation processes. •Continues to complete service delivery reviews.
The Natural and Built Environment Act 2023 and Spatial Planning Act 2023 ***(Repealed by new Government to reinstate the Resource Management Act 1991).***	District or regional resource recovery or waste disposal facilities are included as infrastructure under the new legislation. Waste facilities have the potential to release contaminants to air, land and water, thereby requiring consents and adhering to regional planning requirements. Approvals for new activities includes a number of considerations including national and regional system outcomes amongst other things.	Under its local and regional council responsibilities, the council regulates waste facilities and activities in terms of discharges and land-use effects and controls.
Hazardous Substances and New Organisms Act 1996 (HSNO)	HSNO addresses the management of substances that pose a significant risk to the environment and/or human health, from manufacture to disposal. The act relates to waste management primarily through controls on the import or manufacture of new hazardous materials and the handling and disposal of hazardous substances. Depending on the amount of a hazardous substance on site, the HSNO Act sets out requirements for material storage, staff training and certification.	Ongoing consideration of the council's responsibilities under HSNO, and incorporation of requirements within relevant council contracts.
Health and Safety at Work Act 2015	Outlines health and safety responsibilities for managing hazards and risks to employees at work. This includes working with hazardous	As part of its obligations as a PCBU, the council has created internal guidelines for staff and officers (councillors, local board members).

Document	Key implications for waste	What Auckland Council is currently doing
	substances, such as those encountered during the collection and management of waste.	Obligations for contractors, subcontractors, and volunteers are addressed as part of procurement and contract management processes.
Civil Defence Emergency Management Act 2002 (CDEM)	Local authorities are required to coordinate CDEM through regional groups across the "4Rs" (reduction, readiness, response and recovery) and encourage cooperation and joint action between those groups. Recent disaster events have again highlighted the pivotal role waste management plays in the response phase.	Council includes waste management in its emergency response preparation.
Health Act 1956	Territorial authorities are required to provide sanitary works for the collection and disposal of refuse, for the purpose of public health protection. During the Covid-19 lockdowns, waste management and minimisation was deemed an essential service.	In preparing this Waste Assessment, consideration is given to ensuring the Auckland region continues to have to assess adequate facilities for waste collection and disposal to maintain public health.
Biosecurity Act 1993	Provides a legal basis for excluding, eradicating and effectively managing pests and unwanted organisms.	Management of biosecurity risks has been supported by contractual and operational practices that allow tracking of waste collection vehicles and disposal of material. An example is the 2015 controlled removal and disposal of fruit and vegetables from the Grey Lynn area when the Queensland fruit fly was detected. These activities were conducted in cooperation with MPI. Invasive exotic marine species (e.g. caulpera) are becoming an increasing risk, which require land-based disposal options.
Building Act 2004	Sets out the rules for the construction, alteration, demolition and maintenance of new and existing buildings in New Zealand. Amendments to the Act are expected to legislate the requirement for waste management plans on building sites.	Advocating for the introduction of site waste management plans for construction and demolition activities through the proposed Building for Climate Change Amendments to the Building Act 2004. Continue to develop evidence to demonstrate how deconstruction rather than demolition can save significant costs and emissions over the lifetime of a building.
Auckland Council plans/strategies		
Auckland Plan 2050	The Auckland Plan 2050 sets the direction for how Auckland will grow and develop over the next 30 years. It responds to the key challenges we face today – high population growth, sharing	Working with mana whenua to create resilient waste infrastructure that can withstand short-term shocks and work well in the long-term particularly in the face of climate change; and meet the outcomes

Document	Key implications for waste	What Auckland Council is currently doing
	prosperity among all Aucklanders, and reducing environmental damage.	associated with Māori identity and wellbeing described in the Auckland Plan. New infrastructure requires a significant investment of time and money. New ways of delivering core services can help turn waste into resources. We are starting now to create the systems and services we want in the future.
Auckland Unitary Plan (AUP)	Guides the use of Auckland's natural and physical resources, including land development. Establishes discharge activity status and related controls for closed landfills, contaminated land, cleanfills, managed fills and landfills, and also for the application of biosolids to land. Establishes assessment criteria for new buildings and external alterations and additions to buildings, including consideration of whether on-site rubbish storage and sorting of recyclables materials is sufficiently sized and accessible. Multi-unit developments (MUDs), can have complex needs in terms of storage space for waste and recycling receptacles, and access requirements for collection vehicles. Currently, MUDs with 10 or more units require an approval via the Waste Management and Minimisation Bylaw which is an ineffective tool for getting good outcomes for future MUD residents. The amount of waste storage – whether it's in individual rubbish bins or a combined collection, is a significant factor in addressing council objectives with regard to amenity, waste reduction, and traffic congestion, amongst others. Poor on-site waste management can negatively affect diversion potential, safety, hygiene, building appearance, traffic congestion and pedestrian safety during collection days and times.	Facilitate the progress of beneficial re-use of surplus soils through a sustainable soil management framework that nests with the requirements of the Auckland Unitary Plan consenting of surplus soil removals and controls for Class 2-5 landfills. Waste Solutions is advocating for changes to the AUP to contain specific standards for MUDs (storage and servicing access) for waste and recycling services, to aid in efficient delivery of services to future residents of those developments and increase participation in diversion behaviour. Progress the development of improved waste standards for four or more units through the plan change process to enhance well-functioning urban environments in higher density developments.
Te-Taruke-A-Tawhiri: Auckland's Climate Plan	Waste Solutions actively contributes to the reduction of emissions in Auckland through the plan's food priority and through the zero	Food priority: Deliver education and behaviour change programmes to prevent food waste, support redistribution of food through food rescue initiatives,

Document	Key implications for waste	What Auckland Council is currently doing
	waste, circular economy priority which incorporates the activities of the Resource Recovery Network (RRN).	encourage home and community composting where possible, including local composting initiatives, collect remaining food waste with a kerbside collection of food scraps in urban areas of Auckland, lead by example in council facilities and drive zero waste events, advocate for government policies and funding to drive waste reduction. Zero waste circular economy priority: Implement the Auckland Waste Management and Minimisation Plan, including expansion of the Resource Recovery Network across Auckland. Incorporating circular and regenerative principles will support Māori whānau and Māori business ecosystems. Enabling Tōnuitanga will progress the economic shift to a more regenerative, distributive, and thriving economy.
Nga Hapori Momoho: Thriving Communities Strategy 2022-2032	This strategy explains how Auckland Council will contribute to creating a fairer, more sustainable region where every Aucklander feels like they below by being integrated and connected, using targeted approaches and shifting to a role as an enabler. To deliver on the objective of increasing local climate resilience and sustainability, Council needs to provide high quality waste services to protect the environment, that are accessible for all of Auckland's diverse communities.	Key actions identified to achieve this • Support initiatives that help communities develop the capacity to be more self-sufficient (building, repairing things, gardening, cooking) and encourage increased sharing of resources (tools, appliances, cars, skills, childcare, food) • Stimulate innovative local solutions to climate change and support delivery of local projects which empower residents and community groups to increase the uptake of low carbon behaviours. • Support community leadership and innovation which focused on local food security, particularly indigenous food systems and those involving intergenerational and cross-cultural sharing of knowledge
Civil Defence Emergency Management Plan	Auckland's plan for waste management during and after a significant event. It identifies hazards and risks to be managed by	Council includes waste management in its emergency response preparation.

Document	Key implications for waste	What Auckland Council is currently doing
	the Auckland CDEM group and methods required to do so (including implications for collection and disposal of wastes)	
Waste Management and Minimisation Bylaw 2019	The bylaw is a regulatory mechanism to manage and minimise waste and to protect the public from waste-related health and safety risks and nuisance. It applies to the collection and disposal of waste from public places, requiring people to dispose of material appropriately, and requiring collectors and operators of various waste-related facilities to obtain council approval. It does not distinguish between public or private provided waste services with the regulation applicable to all. It allows for further regulatory controls to be established relating to how waste is stored or separated amongst other things. The bylaw also requires waste minimisation plans be provided for trading, events, and filming in council-controlled public places and for multi-unit developments, whether those are new developments or existing. Other provisions of the bylaw relate to potential waste from shopping trolleys and unaddressed mail; and burial of dead animals on premises	Working with waste industry collectors and facilities and those requiring event permits to manage and minimise waste in accordance with the bylaw and the objectives and goals of the WMMP; and reviewing the existing 2012 controls to align, streamline and update those in light of new government regulation to standardise kerbside collections.
Auckland Water Strategy 2022- 2050	Litter, illegal dumping, and discharges of solid wastes into water systems all degrade Auckland's waterways and impact water infrastructure. The Auckland Water Strategy (2022 – 2050) is Auckland Council's 30-year approach to water, guided by the vision te mauri o te wai, that the life-sustaining capacity of Auckland's water is protected and enhanced. The strategy seeks to improve water quality and restore and enhance water ecosystems, including actions that integrate land use and water planning.	Working with organizations to provide community engagement on the interaction between solid waste and water systems, as well as the provision of litter and illegal dumping clean-up and enforcement services. Watercare manages trade waste through its wastewater bylaw, and there is also council's Making Space for Water programme, developed by Healthy Waters, as part of Auckland Council's flood recovery programme, led by the Recovery Office.
Kia ora Tāmaki Makaurau 2021	Auckland Council's Māori outcomes performance measurement framework – is a framework focused on well-being. It shares the outcomes that Māori feel most matter to their whānau, marae, iwi	Working with mana whenua representatives to review and strengthen the WMMP. Staff have sought input also from Māori groups working to reduce waste in the community as part of the work to review the plan.

Document	Key implications for waste	What Auckland Council is currently doing
	and communities. The framework identifies focus areas where the council can best influence and support Māori outcomes; and provides measures for success. This crosses over all the council's activities including waste. For example, the plan includes outcomes linked to effective Māori participation, with a measure of the percentage of adopted core strategies, policies and plans incorporating Māori outcomes or developed with Māori participation	Staff continue to engage with Māori and mana whenua through delivery of our work programmes and policy as they are delivered.
Independent Māori Statutory Board - Schedule of Issues of Significance 2021-2025	The Schedule of Issues of Significance (IoS) is a statutory document produced by the **Independent Māori Statutory Board** that guides their advocacy to Auckland Council, Local Boards and Council-Controlled Organisations, for and on behalf of Māori in Tāmaki Makaurau. The schedule outlines 29 issues of significance which all connect to actions of importance for improving outcomes for Māori in Tāmaki Makaurau. This includes issues such as access to infrastructure – to ensure that Māori are enabled to actively and meaningfully contribute to decision-making in future infrastructure projects; among other things	As above, staff are working with mana whenua representatives and engaging with mataawaka groups who are working in waste, to ensure that outcomes of our programmes and policies, and that the content of the next WMMP, supports outcomes important to Māori as outlined in the Schedule.
C40 Cities Advancing Towards Zero Waste Declaration.	The C40 Cities Climate Leadership Group is a group of over 90 global cities that are committed to taking bold climate action, leading the way towards a healthier and more sustainable future. Auckland has been recognised as an Innovator City within the C40 network since 2015 and has endorsed a range of C40 commitments, the Advancing towards Zero Waste Declaration and the Global Green New Deal which both have implications for waste avoidance.	Targets include cutting the amount of waste generated by each citizen by 15 per cent by 2030, reducing the amount of waste sent to landfills and incineration by 50 per cent, and increasing the diversion rate to 70 per cent by 2030. Cities that sign up for the pathway commit to a 2030 target of: • providing timely city-wide waste collection services; • treating at least 30 per cent of organic waste; • and reducing waste disposal emissions by at least 30 per cent.
2021 Infrastructure Strategy (which forms a part of council's Long-term Plan 2021 – 2031)	Infrastructure Strategy 2021 is Auckland's third since becoming a super-city in 2010, but the first strategy to include council's waste infrastructure.	Council's Waste Infrastructure Portfolio has a book value of approximately $103 million (as of Jan 2023) which is made up of land and assets including, over 1 million kerbside bins, the Waitakere Resource Recovery and Transfer Station, and the network of Community Recycling Centres which form the expanding Resource Recovery Network (RRN).

Document	Key implications for waste	What Auckland Council is currently doing
	The strategy looks to the next three, 10 and 30+ year horizons for Auckland Council's infrastructure needs; addressing big issues that impact our infrastructure, and ensuring decisions and investments address these issues in a considered and coordinated way. The inclusion of waste infrastructure in council's Infrastructure Strategy aligns well with the approach taken by Te Waihanga – NZ Infrastructure Commission which published NZ's first ever 30-year Infrastructure Strategy, Rautaki Hanganga o Aotearoa in 20221. The Infrastructure Strategy is currently under review as part of the next LTP three-yearly review process and will be approved in 2024. Key issues identified in council's next Strategy, as agreed by council committee in 2023, expand on the existing Strategy's five key issues, and are described as follows: Inequity, Resilience, Funding, Te Ao Māori, Environmental Degradation, Emissions Reduction, and Growth.	With the current roll out of council's food scraps kerbside service, standardising rates-based refuse collections, expansion of the RRN, as well as the transfer of the Materials Recovery Facility in Onehunga to council ownership in 2024, total asset value will be increasing over the coming years. Waste minimisation and management services across the region rely on infrastructure owned by council (or partly owned), as well as other critical infrastructure and assets owned and operated by the private sector. Council's first complete Asset Management Plan (AMP) for its own waste services and assets was developed by Waste Solutions department in 2020 to address the ongoing need to assess asset condition and plan and manage renewals and improvement expenditure. Several other AMP plans for assets across the council group have connections with waste minimisation and management assets and activities, including those developed by council's Community Facilities and Closed Landfills departments. The Infrastructure Strategy presents opportunities to bring together decision-making on long-term investment needs for assets and activities that have related functions.

3 Progress against 2018 WMMP

The 2018 WMMP sets out an approach for reorganisation of Auckland's waste policies, infrastructure and services, driven by the need for a coordinated regional strategy, decisive leadership, and robust and non-fragmented delivery. The plan sets out three key targets, nine priority actions and 103 specific actions to work towards zero waste by 2040.

Key highlights of progress made towards the 2018 goals include:

- successful advocacy to central government for increasing the waste levy and product stewardship initiatives (especially a container return scheme),
- expansion of the resource recovery network,
- aligning kerbside services,
- trialling and rolling out kerbside food scrap collections,
- successes in construction and demolition waste,
- strengthening our partnerships with Māori and the community to deliver education and awareness.

The council continues to focus on aspects of direct control, such as domestic kerbside collection, while developing its role as regulator, role model, and advocate for waste minimisation. It also continues to work with industry and business to encourage reduction of waste under their control.

3.1 WMMP goals, objectives and targets

The **vision** of Auckland's WMMP 2018 is: "Auckland aspires to be Zero Waste by 2040, taking care of people and the environment, and turning waste into resources."

The **targets** to reduce are:

1. total waste to landfill
2. domestic kerbside waste
3. the waste we generate in our own council offices and from council operations.

Taking the vision and targets into account, the 2018 WMMP identified the following nine areas of **priority actions** required to achieve the targets:

1. Advocate for an increased waste levy
2. Advocate for product stewardship
3. Address three priority commercial waste streams:
    - Construction and demolition waste
    - Organic waste
    - Plastic waste
4. Continue establishing the Resource Recovery Network

5. Focus on reducing litter, illegal dumping and marine waste
6. Continue to transition to consistent kerbside waste and recycling services
7. Deliver the domestic kerbside food waste collection
8. Address waste diversion from the council's own operational activities
9. Work in partnership with others to achieve a Zero Waste Auckland.

These priority actions were further broken down into the 103 specific actions within the plan.

3.2 Monitoring progress

3.2.1 Progress against 2018 targets

Presented below are the results of the council's monitoring against 2018 WMMP targets. The most challenging target established within the 2018 WMMP is the 30 per cent reduction in total waste to landfill by 2027, from the 2010 baseline of 0.832 tonnes/capita/year. The council faces challenges in delivering this level of change, with much of the waste managed by the private sector. Based on the available data, progress is not on track to achieve this goal[4].

Estimates of total waste to landfill are impacted by a range of factors including:

- large one-off infrastructure or construction and demolition projects
- Natural disasters which generate one-off significant volumes of debris and waste
- contaminated sites remediation which can create spikes due to irregular timing and potentially high quantities
- the impacts of recession or economic growth.

These factors have all impacted on waste in Auckland to some extent over the last 20-years and are expected to impact in the future. This waste assessment (within Chapters 7 and 8) considers the challenges in achieving this reduction goal for total waste to landfill and suggests addressing areas of more specific focus may help to achieve this goal.

Table 2 Progress against Waste Plan targets 2018 – 2022 (end)

Target 1: Total regional waste	
Target	Reduce total council- and private-sector-influenced waste to landfill by 30 per cent by 2027 (from the baseline of 832kg to 582 kg per capita per year)
How we're tracking	**Partly on track** 873kg (increase of 4.9 per cent from the 2010 baseline, however a decrease of 16 per cent since the peak in 2016)

[4] This measure has been calculated for a small number of years (2002, 2007, 2010, 2015, 2016, 2021, 2022), with figures for those years showing fluctuations in order of +/- 20%.

Explanation: Auckland Council has direct control over only approximately 20 per cent of the waste stream through the contracts for domestic collections that it manages, the Waitākere Refuse and Recycling Transfer Station and council's own operating activities. While domestic kerbside waste has reduced slightly (refer target below), overall waste quantities including commercial, and construction and demolition waste have increased since the 2010 target was set. Although the effects of Covid-19 have impacted continuity of datasets, recently, tonnages are showing signs of stabilising. The recently released NZWS and the proposed supporting legislative changes to drive a circular economy and support for waste minimisation should impact total waste to landfills in the future.

Target 2: Domestic waste	
Target	c. Reduce domestic kerbside refuse by 30 per cent by 2021 (from 160kg to 110kg per capita per year). d. After 2021, reduce domestic kerbside refuse by a further 20 per cent by 2028 (from 110kg to 88kg per capita per year)
How we're tracking	 **Partly on track** 141kg (decrease of nearly 12 per cent from the baseline)

Explanation: Domestic kerbside waste has reduced slightly, however due to the delay in the rukenga kai/food scraps collection rollout, there is a delay in reaching the 2021 target. Food scraps currently comprise about 41 per cent of kerbside waste by weight; and removing those from refuse bins, combined with a reduced frequency for refuse collections, will enable us to reach the target.

Target 3: Council waste	
Target	c. Reduce council's own in-house office waste by 60 per cent per capita by 2024 (from a 2012 baseline) d. Work across council to set a baseline for operational wastes and, by 2019, put in place targets for reduction.
How we're tracking	 **Partly on track** 44 per cent reduction of in-house office waste in 2019 – noting not assessed during the pandemic. Targets for operational waste not yet established.

Explanation:

a) As of 2019, waste from council offices had reduced from the baseline by 44 per cent, however, changes in working behaviour and patterns have necessitated a change in the way this metric is assessed. In 2018 when the target was developed, the number of FTEs was a relatively stable metric to use for calculating waste per capita from council buildings. From 2020 onwards, a more relevant metric is visitation data based on swipe card access. Noting also that staff usage of council offices has changed substantially, comparisons with the historical baseline is challenging. We propose a new baseline and metric be established.

b) The approach to set operational waste baselines and targets has not yet been established due to the complexity and breadth of council and CCO activities, however the Waste Plan has led to a zero-waste outcome being included in council's sustainable procurement framework which is being applied to high value contracts and major construction projects and will be incorporated within all contracts in the future. Further initiatives are underway to provide across council data on significant operational waste streams.

The review of progress against these targets demonstrates two key findings:

- The target for reduced kerbside waste to landfill appears achievable but is contingent on implementing the planned changes to the kerbside collection service.
- The target for reduced overall waste to landfill, which addresses the 80 per cent of waste outside the council's direct control, is not on track to be met. While estimates have increased from the 2010 baseline, the rate of disposal to Class 1 municipal landfill has slowed in recent years (Refer to Chapter 4.2.1). This emphasises the need for collaboration with the private sector and wider community to identify and deliver options for reduced waste to landfill. Interrogation of waste to landfill data indicates the high level of development across the region is likely affecting disposal rates much more than the council's waste minimisation activities.

3.2.2 Progress against priority actions

There has been good progress on the nine priority actions of the 2018 plan, as summarised in the table below.

Table 3 Progress against priority actions in the 2018 WMMP

Priority 1: Advocate for an increased waste levy	
Key Highlight	The government has begun to progressively increase and expand the waste levy, reaching $60 per tonne for municipal landfills by 2024. It will also cover additional landfill types including construction and demolition fill and managed or controlled fill. The NZWS shows strong central government support for a circular economy and action at all levels of the waste hierarchy. However, further rises in the levy would support better waste minimisation outcomes as advocated by the council in Appendix A
Priority 2: Advocate for product stewardship	
Key Highlight	The council has sustained advocacy for product stewardship including: • Input (via participation in WasteMINZ sector groups) on Ministry for the Environment (MfE) priority products (for product stewardship schemes) • co-leading, with Marlborough District Council, an MfE-funded design process for a national beverage container return scheme (CRS) • submitting in strong support to the MfE public consultations on a proposed national beverage CRS, a new waste strategy, and options for updated waste legislation
Priority 3: Address three priority commercial waste streams: **a. Construction and demolition waste** **b. Organic waste** **c. Plastic waste**	

Key Highlight	The council has driven work on several fronts to address construction and demolition waste and associated plastic waste. Highlights include working with large developers and suppliers of construction materials; for example, Kāinga Ora and Auckland Council have changed the way they clear sites, construction companies like Nigel Benton and Naylor Love are challenging regular site waste practices and Athfield Architects have worked on designing out waste. We have also supported work on a courses, qualifications and awards on construction and deconstruction to minimise waste and provide guidance on site waste management. Alternative destinations for construction and demolition waste are emerging with Community Recycling Centres and Product Stewardship schemes developing their capacity.
Priority 4: Continue establishing the Resource Recovery Network	
Key Highlight	We now have 12 community recycling centres established, two years ahead of schedule. A revised Resource Recovery Network (RRN) Strategy was adopted in February 2021, expanding the previous proposal for 12 community recycling centres by 2024, to 23 facilities by 2031. $10.67 million of shovel-ready funding, provided by government as part of the Covid-19 recovery response, has enabled the upgrade of five existing community recycling centres (CRCs) and redevelopment of the Waitākere Refuse and Recycling Transfer Station into a Resource Recovery Park. A $2.4 million grant from the government's Waste Minimisation Fund has also enabled establishment of a community recycling centre in Onehunga.
Priority 5: Focus on reducing litter, illegal dumping and marine waste	
Key Highlights	The council has made submissions on government proposals to reform the Waste Minimisation Act and Litter Act with strengthened legislation and to progress plans to introduce a national beverage container return scheme which will reduce litter. Local boards have provided funding and support for innovative council initiatives to address litter. An example is the Construction Waste Leadership programme targeting construction and demolition waste and providing action on building site behaviour and illegal dumping in Flat Bush and Scott's Point, which we are looking to expand to other local board areas. Staff are continuing to support the Hauraki Gulf Forum and work with the Manukau Harbour and Tāmaki Estuary Environmental Forums to improve marine

	environments as well as providing funding and support for other community clean-ups and organisations like Sea Cleaners to clean up marine litter.
Priority 6: Continue to transition to consistent kerbside waste and recycling services	

Key Highlights	Strengthened our ability to influence household domestic kerbside waste through:
	• gaining approval, following public consultation, to amend the Waste Plan and move towards a regional rates-funded refuse service with a choice of three bin sizes to accommodate different household needs, based on a review of evidence that Pay-As-You-Throw was not driving waste minimisation as anticipated.
	• gaining approval to harmonise:
	  • kerbside service charges for multi-unit residential developments of 2-9 properties, and
	  • opt-outs for multi-unit residential developments of ten or more properties, farms and businesses across the region

Priority 7: Deliver the domestic kerbside food waste collection	
Key Highlight	Roll out began on 4 April 2023. Rukenga kai / food scraps bins were delivered to all eligible properties by end of November 2023. The service has received significant radio, TV and newspaper exposure. Auckland Council Community Partners and internal education staff are working where the service has rolled out educating residents and encouraging participation in the service.
Priority 8: Address waste diversion from the council's own operational activities	
Key Highlights	There are many examples of significant waste diversion initiatives being implemented across the council group. For example, the work by the Link Alliance with TROW Group on the Mt Eden demolition works for the City Rail Link was recognised as a joint winner in the innovation category of the 2021 Zero Waste Awards. The council continues to take the lead on innovative projects that challenge the normal approaches to demolition waste. Our deconstruction of the Herne Bay Masonic Hall, for example, resulted in almost zero waste to landfill with usable fixtures and fittings distributed to community organisations in Auckland and building materials sent to Tonga to assist in the rebuilding of Queen Salote School.
Priority 9: Work in partnership with others to achieve a Zero Waste Auckland	
Key Highlights	We have continued to build partnerships to reduce waste for the 80 per cent of waste that is not under council's direct influence:

	• Māori participation is increasingly embedded in our own practice and in contracts with other community partners and council organisations. For example, through mahi of marae such as Papatūānuku Kōkiri Marae and through the Para Kore ki Tāmaki programme. • We have tailored our initiatives and established several new community partnerships to reach out to diverse communities, in response to the Ethnic Communities Engagement Framework, developed in 2020. • We have continued to distribute $500,000 in grants per year through the Waste Minimisation and Innovation Fund across industry and community sectors to stimulate waste minimisation. • We have worked with the commercial sector as reflected in Priority 3 above.

In summary, good progress has been made in all areas of priority action from the 2018 WMMP, despite a period of considerable interruption during 2020-2022 due to Covid-19 and related restrictions. Covid-19 introduced challenges including maintaining public momentum for waste minimisation, the need to pause and re-schedule inorganic collections, loss of revenue and increases in shipping costs for transporting recyclable commodities, linked also to an ongoing fluctuating market for recyclables.

Key challenges moving forward in these priority areas are largely around waste legislation. Currently there are a lack of legislative tools to drive a circular economy and minimise waste, though the waste legislation reform and other changes outlined in sections 2.3.2 and 2.3.3 could make a significant difference. The introduction of a national beverage container return scheme and increased requirements for product stewardship schemes would assist in the reduction of waste streams not directly managed by council.

4 The waste problem

In accordance with Waste Minimisation Act 2008 requirements for councils to undertake a waste assessment, this chapter contains a summary of available information about wastes generated in the Auckland region that are collected and recycled, recovered, treated or disposed of to landfill, cleanfill or managed fill. In addition, this waste assessment considers the flow of materials that are diverted for reuse purposes, or indeed other waste materials that are avoided in the first place by 'designing-out' waste.

The information presented in this section includes data about quantities, trends, composition, source and destination of waste and diverted materials. There exists minimal information available to describe and quantify materials that are avoided or diverted for reuse however, compared with those waste materials handled and quantified through various recovery, recycling, or disposal pathways. The information presented provides the basis for projecting future demand for waste management and minimisation services as outlined in Chapter 6 of this document.

It is important to make a distinction between 'waste generation' and 'waste to landfill', equally what materials/wastes are referred to when discussing 'waste diversion'. Waste generation includes all wastes generated through all stages of a product's lifecycle, from resource extraction, production and consumption, right through to the discarding of waste, whereas waste to landfill is just measured at the disposal stage. As described in the NZWS, materials that enter the waste management system include materials that can be recycled, as well as those that are disposed to landfill – and therefore represent some wastes (or materials) that are diverted from landfill.

While waste to landfill can theoretically decrease, waste generation can remain static. This means society, the planet and future generations are not any better off in terms of preserving and regenerating natural resources.

As mentioned earlier, the new NZWS includes a national target to represent the decoupling of natural resource use from economic growth, which is a key aspect to a circular economy[5]. Such measures aim to track progress by reducing wastes at source and other circular interventions rather than just measuring waste to landfill.

To contextualise this thinking, an example of a regenerative, circular economy production model advocates using as many biodegradable materials as possible in manufacturing consumer goods so that these can return to nature without causing environmental damage once their useful lives are over.

Auckland Council measures some waste generation data, for example within households, but has less oversight of commercial and industrial waste generation. However, to better align Auckland Council's work with the goals of the New Zealand Waste Strategy, we have proposed actions that - going forward - aim to measure and reduce waste generation as well as disposal of waste to landfill.

Data from regulated product stewardship and extended producer responsibility schemes will help to close the gap on measuring waste generated from products and services consumed in the Auckland economy.

For the purposes of this waste assessment, 'waste disposal' is limited to waste to landfill, cleanfill or managed fill.

[5] i.e. "Reduce the amount of material entering the waste management system by 10 per cent per person". Page 20, NZWS.

Under the Waste Minimisation Act 2008, diverted material refers to "anything that is no longer required for its original purpose and, but for commercial or other waste minimisation activities, would be disposed of or discarded".

Diverted materials can include reuse, which is a higher order activity in the waste hierarchy than recycling and recovery, which Councils must consider when developing Waste Assessments and Waste Management and Minimisation Plans. As noted earlier however, there is a lack of information and data available to quantify these types of activities.

Diversion can also include materials collected for recycling, composting or other recovered or treated materials that are diverted from landfill. Liquid and gaseous wastes directly emitted to the air, land or water are not included, as these are dealt with by the Natural and Built Environment Act 2023 (NBA) and addressed by other council strategies and plans (e.g. wastewater).

The scope of this waste assessment covers all waste and diverted materials, as defined above, within the Auckland Council area, including waste and diverted materials controlled by the Council (both collected by council and generated by council activities) and that controlled by the private waste industry.

4.1 General data limitations, completeness and assumptions

The council endeavours to ensure the accuracy and completeness of waste data as much as possible. However, there are recognised limitations due to the council's low-level ownership of the region's waste infrastructure and subsequent reliance on the private sector to provide data.

In some cases, tonnage data is estimated from intermittent or periodic surveys, rather than being extracted from actual records, e.g. weighbridge data. Various assumptions have been applied to extrapolate survey results and discrete data over time and across the region, with specific assumptions and limitations noted.

The waste bylaw licencing system has enabled more accurate data to be captured since its introduction in 2019, allowing council to access more accurate data across a wider range of business activities. It remains an ongoing challenge to ensure the required data is provided on time as enforcement options are limited.

It is assumed that data obtained via the waste bylaw licensing is accurate. The council does a sense check of data supplied by industry, but no additional accuracy checks.

The council supports the National Waste Data Framework (NWDF) and its aim to standardise the way in which waste data are collected. The council's current data collection framework is generally consistent with the NWDF and the 2019 bylaw update addressed a number of gaps previously identified.

4.2 How much waste to landfill is produced in the Auckland region?

This section discusses available information regarding waste disposed of to landfill from the Auckland region.

4.2.1 Total levied waste to Class 1 landfills

The information reported in this section has generally been estimated or derived from weighbridge records or tonnage data provided to the council. Tonnages include data reported for the two Class 1 landfills located within the Auckland region (Redvale and Whitford), and for Auckland waste transported and disposed of at Purewa landfill in Whangarei, and an estimate of Auckland's waste disposed of at Hampton Downs landfill in the Waikato.

Non-levied wastes are excluded as these quantities are not reported to Council. Non-levied wastes are typically comprised largely of soils, which are discussed in Chapter 4.3.1.

Table 4 shows aggregated tonnages of waste to landfill over a range of years since 2007, along with:

- Comparative population figures and the resulting annual tonnes per capita, and
- Comparative GDP figures and the resulting annual tonnes per $M of GDP for each selected year.

These indicators (annual tonnes per capita and annual tonnes per $M of GDP) are useful for making comparisons over time and recognising that the level of impact both domestic and commercial activities have on waste tonnages.

Population figures are Stats NZ Population Estimates issued 25 October 2022. Note that the population estimates for 2007, 2010 & 2016 have been updated since the 2017 Waste Assessment.

Table 4 Comparison of total waste to landfill estimates (Class 1 only)

	2007	2010	2016	2022
Estimated tonnes to landfill	1,396,432	1,174,078	1,645,750	1,480,374
Population of Auckland region[6]	1,390,400	1,439,600	1,589,800	1,695,200
Annual tonnes per capita	1.00	0.82	1.04	0.87
GDP of Auckland region ($M)[7]	$89,748	$89,417	$111,548	$133,749
Annual tonnes per GDP ($M)	15.56	13.13	14.75	11.07

Overall, total waste to landfill estimates have reduced in 2022, down 10 per cent compared to 2016 levels, while the population and GDP has continued to increase. Annual tonnes per capita ranges between 0.82 and 1.04 t/person, with more recent figures showing a decline in per capita landfill rates, nearly back to 2010 levels. Similarly, the annual tonnes per $M of GDP have reduced in 2022 to their lowest levels for all years shown.

The exact reason why waste tonnes have decreased while both population and GDP have increased is not clear. Evidence presented later in this waste assessment would suggest waste minimisation behaviour alone has not improved sufficiently to cause this decline.

It is possible this is a reduction in reported tonnes rather than actual tonnes to landfill due to a change in the way waste is classified and reported following the introduction and increases of the waste levy. 2019 saw a reduction of approximately 200,000 tonnes of special waste to landfill, which has not reappeared in recent years. Due to the nature of special waste, it is unlikely that the generation of this waste has reduced

[6] Population data from Stats NZ Population Estimates issued 25 October 2022.
[7] Auckland's GDP data from Auckland's Regional Economic Profile by Infometrics. GDP is measured in 2022 dollars: https://ecoprofile.infometrics.co.nz/auckland/Gdp/Growth

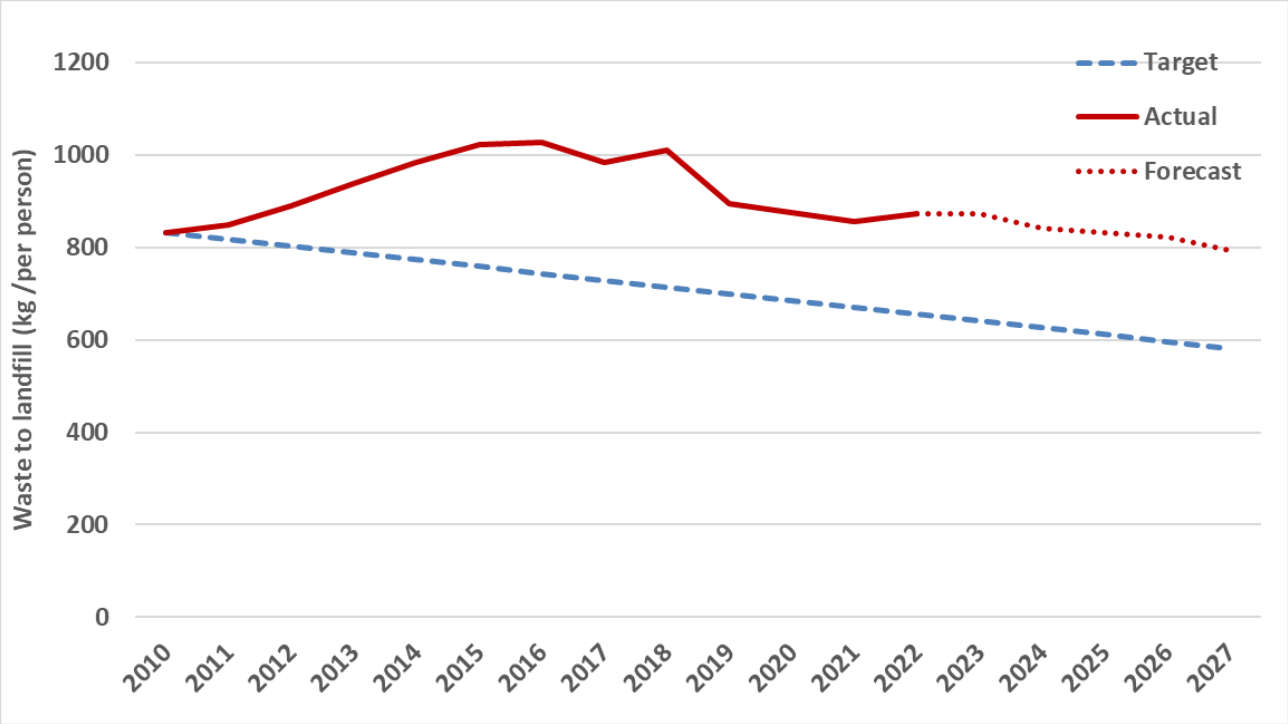
or that it has been diverted away from landfill entirely. It is also possible that more waste is being transported to landfills with less or no reporting requirements.

No evidence is available to support these theories as the information available to Council and presented above includes tonnes of levied waste arriving at Class 1 landfills only. The quality of data is expected to improve with changes to the administration of the waste levy, which required Class 3 and 4 landfills to begin reporting data on tonnages disposed to MFE from 1 January 2023, and for Class 5 cleanfills to begin reporting data on tonnages disposed from 1 July 2023.

2018 WMMP Targets

While the 2022 figures in Table 4 show a decrease in the annual tonnes per capita, further progress is required to achieve the targets set out in the 2018 WMMP, which was a 30 per cent reduction in waste to landfill per capita, from the 2010 levels. Progress against this target is shown in Figure 3 below.

Figure 3 Annual tonnes to Class 1 landfills per capita



4.2.2 Waste to C&D fill, managed fill and cleanfill (Class 2-5 landfills)

A cleanfill site is a land-disposal facility that only accepts cleanfill material (see Key Terms, Chapter 14). Under AUP rules, a cleanfill may be treated as a permitted or controlled activity depending on the annual volume of waste received (less than or more than 250 m^3 per year, respectively). If the cleanfill is unable to meet permitted or controlled activity controls, then it is deemed to be a restricted discretionary activity and consent is subject to council approval. A cleanfill is referred to a Class 5 landfill under the landfill classification system developed by WasteMINZ and adopted by MfE for establishing when and how the waste levy is applied. The landfill classification system and associated levy applied is discussed further in Chapter 5.4.1.

A managed (or controlled) fill site is a disposal site that requires resource consent to accept well-defined types of waste, not including putrescible waste. Commonly, this is material such as low-level contaminated soil and some construction and demolition materials. Under AUP rules, a managed fill is either a controlled or restricted discretionary activity, depending on the site's ability to meet controlled activity controls. Managed fills accepting uniform waste material from an industrial process are often also called mono-fills.

Under the landfill classification system, managed fills are separated into three categories, Class 2, Class 3 and Class 4 landfills. Industrial mono-fills are a separate category under this system.

There is limited information available regarding the volume of waste to managed fill and cleanfill (Class 2-5 landfills) in the Auckland region. Waste sources can be highly variable and may include residential and commercial developments, site redevelopments (e.g. intensification projects), transport and other infrastructure projects. Data on these material flows are difficult to collect, as the facilities are controlled by others and data collection requirements vary. It is hoped that in future, the information MfE collects as part of its waste levy system will be able to be used to provide an aggregated summary of the volume of material accepted by these facilities.

Table 5 summarises the limited information that was presented in council's previous Waste Assessment, on the volume of material accepted at cleanfills and managed fills (Class 3-5 landfills) operating within the Auckland region.

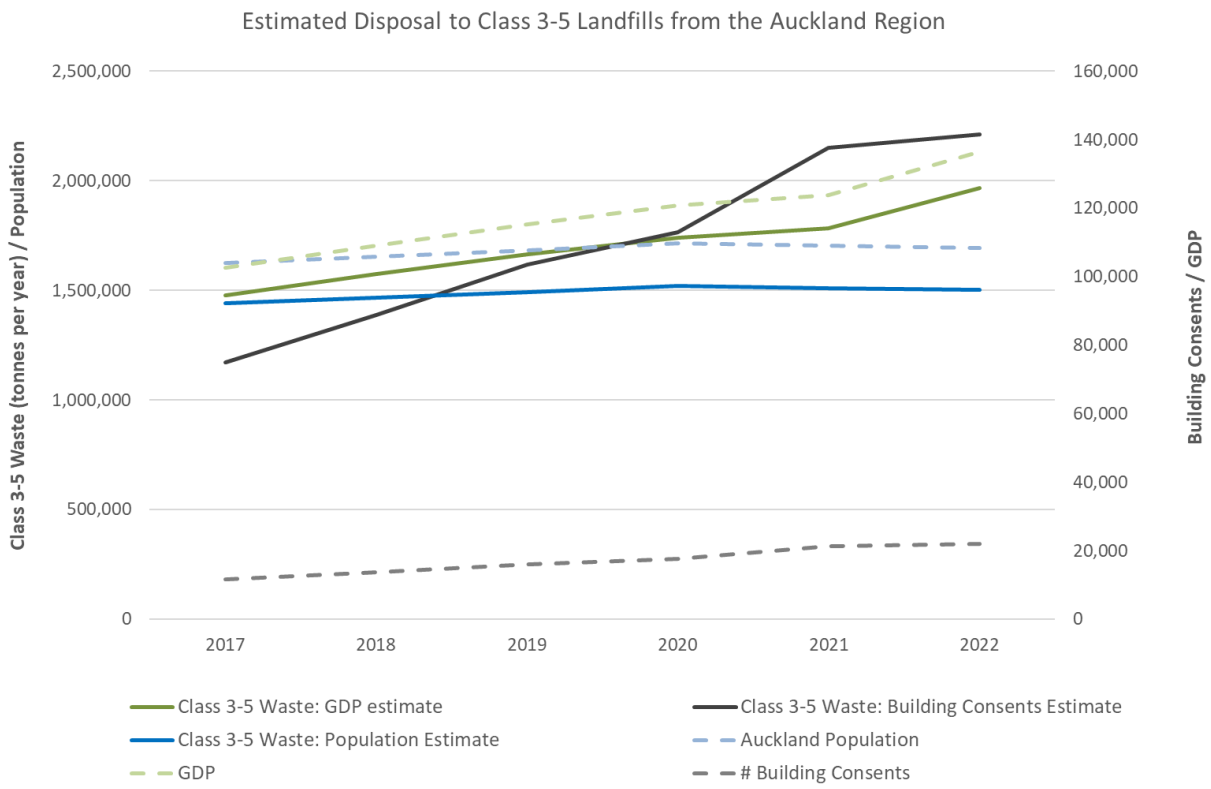
Using two different methods (top down and bottom up) to calculate updated tonnages for 2017-2022, Pattle Delamore Partners examined a range of data sources including waste collector and facility tonnages, MfE reports, earthworks and other consent data, building consents (a rate of fill removal on average per consent), and GDP growth to estimate the tonnages of clean and managed fill from Auckland.

The report concluded that GDP and building consent data provided the best estimate, with tonnages ranging from 1,967,742 tonnes using GDP to 2,213,3892 using building consents, with the average being 2,090,562 tonnes. These tonnages generally align with previous waste assessments from 2010 and 2016, shown in Table 5 below.

Table 5 Summary of data and estimates for disposal of material to managed fill and cleanfill (tonnes/year)

	2010	2016
Managed/Mono fills	620,000	1,018,000
Cleanfills	1,170,000	1,340,000
Estimated total	1,790,000	2,358,000

Figure 4 Estimated disposal to Class 3-5 landfills



4.3 Waste to landfill - sources and composition

This section contains information about the sources and composition of Auckland's waste.

Information on waste sources is limited, other than broad splits between domestic (kerbside) waste and commercial waste.

Other than Chapter 4.3.1 which relates to soils disposed of at Class 3, 4 and 5 landfills, all other waste streams in this chapter are based on the reported quantities of waste to Class 1 landfills only.

Historical data is presented largely as snapshots in time from the preparation of previous waste assessments for direct comparisons. It is important to note that Covid-19 impacted domestic and commercial behaviour during the extended periods of lockdown in 2020 - 2021, and subsequently impacted waste tonnages and compositions over this period. The 2022 data included in this Waste Assessment is assumed to be unaffected by lockdowns, and any residual influence from Covid-19 is part of the long-term regional recovery which now forms part of the backdrop for this waste assessment.

4.3.1 Soils

Waste Solutions has identified soil disposal as one of the largest single material streams being disposed of to landfills within and outside the Auckland region. Soil tonnages moving around the region are far greater than all municipal, commercial and industrial waste to landfill combined.

An estimated 2.09 million tonnes of soil were excavated in 2022 and disposed of to Class 3 and 4 (managed or controlled fill), or Class 5 (cleanfill) disposal facilities within and outside the Auckland region.

An estimated 1,238,532 tonnes is disposed of Auckland Council-consented cleanfills and managed fills, while an estimated 190,731 leaves the region, to be disposed of in North Waikato fill sites.

The drivers for waste or surplus soil generation are complex and not within the direct control of the Waste Solutions Department. There are multiple actors across Council, government, the construction and development industry who have some level of oversight and influence at different parts of the system.

4.3.2 Composition of reported waste to Class 1 landfills

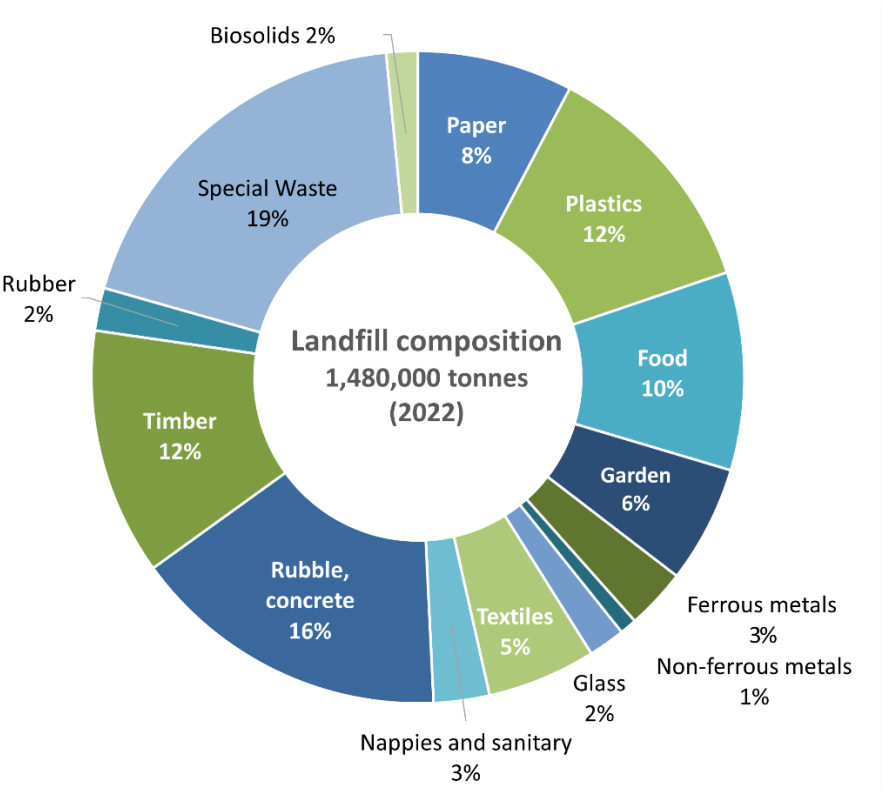
Table 6 summarises the estimated aggregated Class 1 landfill composition for the Auckland region. This is based on composition information from SWAP data required for resource consent monitoring for Redvale and Whitford landfills, and composition estimates based on the 2018 National landfill waste composition estimate (conducted by WasteNot Consulting Ltd for MfE) for the portion sent out of Auckland to Purewa and Hampton Downs.

Table 6 Estimated composition of reported waste to Class 1 landfills

SWAP Primary Classification Category	2010 %	2016 %	2022 %
Paper	8%	8%	8%
Plastics	8%	12%	12%
Organics	19%	19%	16%
Ferrous metals	4%	2%	3%
Non-ferrous metals	1%	1%	1%
Glass	2%	1%	2%
Textiles	4%	4%	5%
Nappies and Sanitary	3%	2%	3%
Rubble	9%	21%	16%
Timber	15%	10%	12%
Rubber	1%	2%	2%
Special waste / Potentially hazardous	25%	17%	21%

These same values are shown proportionally in the figure below, with biosolids being a sub-category of special waste:

Figure 5 Estimated composition of waste to landfill (Class 1)



Special waste / potential hazardous material (including biosolids) is a consistently significant and highly variable component, both in terms of quantity and GHG emissions potential. As the data above are based on landfill SWAPs, the proportion of special waste / potentially hazardous material is highly dependent on when the SWAP was conducted, and changes should be interpreted with caution. There are few waste minimisation and diversion opportunities for this waste, so it is not examined in detail in this assessment and is excluded from the future trend forecasts (Chapter 6).

Other significant components of the waste stream in 2022 are organics (garden, food and other non-garden organic wastes), rubble, plastics and timber. Significant changes in 2022 have been:

- A reduction in the percentage of rubble since 2016 from 21 per cent to 16 per cent (up 7 per cent from 2010), and
- A reduction in the percentage of timber since 2010 from 15 per cent to 12 per cent (up 2 per cent from 2016).

No single category has increased substantially since 2016. Marginal changes in percentages (1 per cent) of other materials are unlikely to be significant as SWAP data is only a snapshot in time as noted above.

4.3.3 Greenhouse gas (GHG) emissions from reported landfilled waste

Historically, the composition of waste to landfill was considered mainly in terms of the volume of space occupied in the landfill. However, as different materials breakdown in the landfill, they produce GHG emissions at different rates. Therefore, the composition of materials disposed of to landfill now holds a dual significance, impacting not only the physical volume but also the future GHG emissions they generate.

The figures for total tonnes of waste to Class 1 landfill from 4.2.1 are summarised here, including the calculated emissions from these tonnes. Historical emissions have been calculated using MfE's guidance for

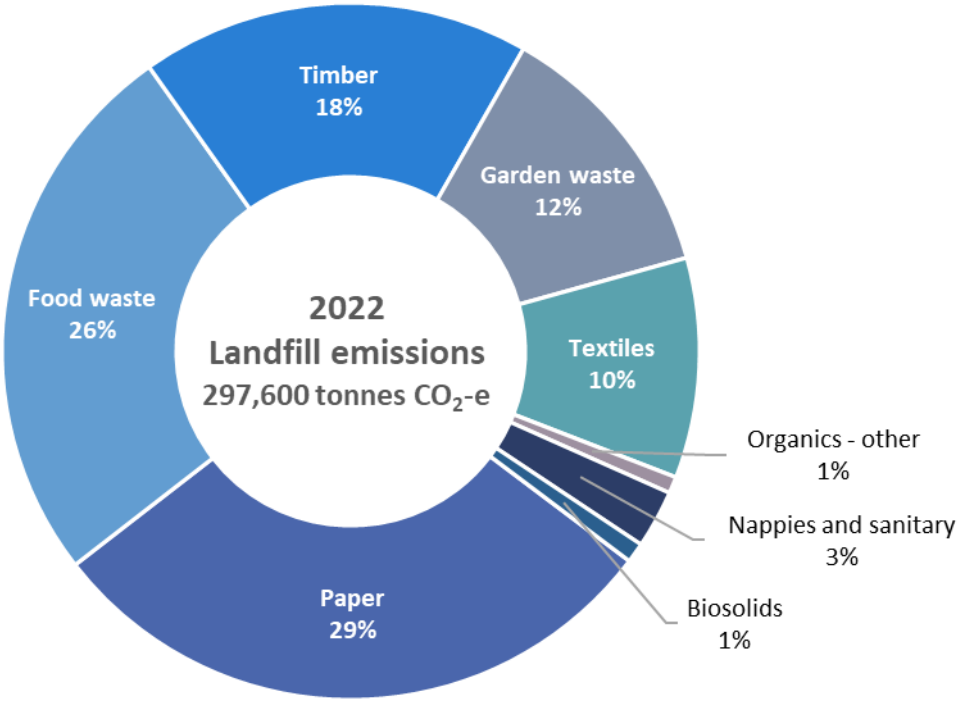
reporting historical emissions. Landfill specific SWAP data has been used where it was available, and the 2018 national landfill waste composition estimate has been used where local data was not available.

Table 7 Estimated annual emissions from Class 1 landfills

	2007	2010	2016	2022
Estimated tonnes to landfill	1,396,432	1,174,078	1,645,750	1,480,374
Estimated annual emissions from tonnes to landfill (CO_2-e/year)	246,886	-[8]	393,546	263,062

For the waste composition in 2022 (shown in Figure 5) the annual estimated emissions is 297,576 CO_2-e/year. Figure 6 shows the breakdown of annual emissions by material type. In addition to Class 1 landfill emissions, 135,000 tonnes of biosolids were placed in the Puketutu Island rehabilitation project in 2022, with estimated emissions of 64,700 CO_2-e/yr based on the MfE guidance for emissions from landfilled sludge.

Figure 6 GHG emissions from waste to landfill in 2022



[8] Data gaps in historical information make this figure difficult to calculate.

Note the contribution of food waste and paper to emissions far exceeds their percentages of tonnes to landfill. Council's rukenga kai / food scraps kerbside collection service is anticipated to reduce the food waste component of emissions from waste to landfill but will not eliminate this waste.

There are opportunities to decrease the contribution of paper in landfill to GHG through a reduction in the amount of paper and cardboard being put onto the market but this direction would need to come at a national level. Some brands have switched their packaging from plastic to paper/card – seeing this as 'more sustainable' and adding to the volume of paper needing to be recycled.

Recycling more paper, even when collected separately, does present challenges for example access to international markets as discussed in more detail later in this chapter. Some products containing paper are not well-suited to recycling (eg. Multi-layered material, food contamination etc).

Looking at paper through the lens of the waste hierarchy focused on upstream activities - rethinking, redesigning and reuse - could significantly reduce the volume of paper needing to be recycled and/or landfilled.

Table 8 Comparison of tonnes to landfill and emissions

Material	% Waste to landfill by weight	% Contribution to annual emissions from landfill
Food waste	10%	26%
Paper	8%	29%
Timber	12%	18%
Garden waste	6%	12%
Textiles	5%	10%
TOTAL	41%	95%

This shows that 95 per cent of annual emissions are generated by 41 per cent of the waste to landfill. Note that 100 per cent of annual emissions are generated by 45 per cent of reported waste to landfill.

4.3.4 Sources of reported waste to Class 1 landfills

Waste to landfill is broadly split into waste generated from domestic and commercial activities.

Table 9 shows the relative tonnages and how they have changed over time. This shows the relatively small portion of the region's waste that comes from domestic activities.

The 2010 figures were drawn from the Auckland Council Waste Assessment – Data Update, August 2011, which amalgamated available data in the first eight months following formation of the council. The 2016 and 2022 figures are based on council contract data, market share surveys and officer estimates of the commercial portion of council kerbside collections.

Table 9 Sources of waste to landfills in the Auckland region (Class 1, reported tonnes only)

	2010		2016		2022	
Source	**Tonnes**	**%**	**Tonnes**	**%**	**Tonnes**	**%**
Commercial waste	925,488	79%	1,413,715	86%	1,241,980	84%
Domestic kerbside waste	248,590	21%	232,035	14%	238,394	16%
Total waste	1,174,078		1,645,750		1,480,374	

This shows the tonnes of domestic kerbside waste sent to landfill has declined since 2010, despite population growth over this period. Commercial waste increased significantly between 2010 and 2016 and has since declined again but still remains well above 2010 levels. As discussed in Chapter 4.2.1, there is no obvious explanation why commercial waste has decreased when GDP has increased over the same time period, however as noted in Chapter 4.2.1 it is unknown how much commercial waste is being diverted from Class 1 landfills to other classes of landfill. This suggests, rather than demonstrating a true decoupling of waste from economic growth, GDP may no longer be a strong predictor of commercial and industrial waste. This could be due to changes in the way waste is classified and reported as being 'disposed' or 'diverted'.

Within commercial waste, the breakdown by industry can be roughly estimated from waste types and activity source in the landfill SWAP reports. This shows that more than half of the commercial tonnages are estimated to be attributed to construction and demolition waste. This continues to be a priority waste stream for council, discussed further in Chapter 8. Figure 5 shows that 28 per cent of all the region's reported waste to Class 1 landfill is composed of 'timber' and 'rubble, concrete, etc', which is associated with construction and demolition activities.

4.3.5 Construction and Demolition waste

Construction and demolition (C&D) waste covers a wide range of activities within the Auckland economy, including:

- Projects relating to horizontal and vertical infrastructure, housing and commercial developments, redevelopments, and renovations.
- The whole life cycle of a project, e.g. design and specification, demolition, site preparation, material use and handling, packaging, earthworks and landscaping.

The composition of C&D waste varies and can be influenced by the nature of the projects being delivered in the region however the following estimate of the composition of total C&D waste to landfill was produced by Council in 2021. These figures are indicative only but represent the best information available and are useful to understand the general composition of C&D waste. Further work is being carried out in this area to enable more accurate reporting.

Table 10 Composition of C&D waste to landfill (excluding soils)

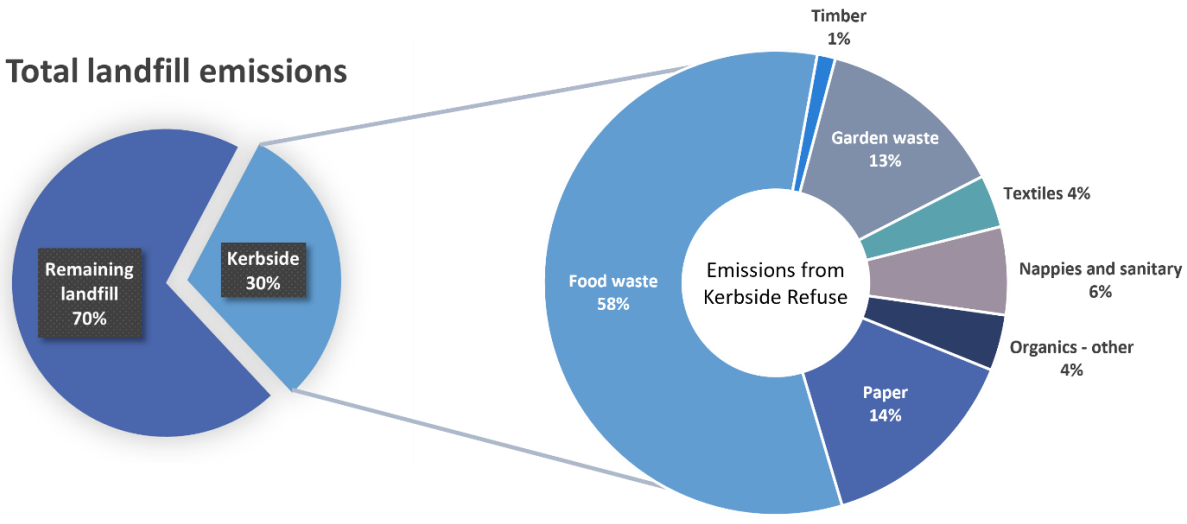
Material	Proportion (% by weight)
Paper	1.0%
Plastics	2.7%
Ferrous Metals	0.5%
Non-ferrous metals	0.3%
Glass	0.3%
Rubble, concrete etc	56.6%
Timber	31.0%
Special /potentially hazardous	7.6%
TOTAL	100%

4.3.6 Domestic kerbside refuse

This section discusses information available specifically regarding levels and composition of domestic refuse collected weekly by council from kerbsides in the Auckland region.

Though only 16 per cent of the total waste to landfill, kerbside refuse contributes 30 per cent to the total emissions from landfill, due to the composition of the waste collected, with the majority of this coming from the high percentage of food waste in kerbside refuse.

Figure 7 Kerbside contribution of emissions from landfill



The SWAP analysis that informs this waste assessment was carried out in March 2023 (included in Appendix B) and was based on samples of refuse bins from rates-funded areas in anticipation that this will most closely represent the whole region once rates-funded kerbside refuse services are introduced throughout.

The data for 2022 include an estimate of the tonnes collected through private kerbside collections, based on market share surveys, however with the policy decision to move to a region-wide rates-funded refuse approach, the number of private collections are expected to dramatically reduce in the future. It is estimated that currently around 50,000 tonnes of kerbside domestic waste are collected annually by private operators.

MUDs were analysed in a separate SWAP and are discussed in Chapter 4.3.7.

Data in this section also excludes other domestic sources such as inorganic refuse or waste taken directly to a disposal facility, council collection of street litter, illegal dumping, and public litter bins.

Table 11 presents composition data derived from kerbside refuse SWAPS. In 2016, more than 80 per cent of the organic kerbside domestic waste was food waste. In 2022, food has dropped to 74 per cent of organic kerbside waste and is anticipated to drop further as the kerbside food collection is rolled out through 2023.

Auckland Council kerbside collections contain a small proportion of commercial waste, in the order of six per cent. This commercial portion is deducted from estimates of current and future domestic waste tonnages.

Table 11 Domestic kerbside refuse composition

	2011		2016		2023	
Waste Category (SWAP)	Tonnes	%	Tonnes	%	Tonnes	%
Paper	20,359	10.5	20,346	8.4	16,688	7.0
Plastics	21,816	11.2	29,522	12	25,985	10.9
Organics	108,036	56	136,665	56	131,593	55.2
Ferrous metals	3,946	2.0	2,969	1.2	5,483	2.3
Non-ferrous metals	1,358	0.7	2,599	1.1	3,099	1.3
Glass	3,534	1.8	4,697	1.9	5,006	2.1
Textiles	7,118	3.7	8,620	3.5	8,582	3.6
Nappies & sanitary	22,915	12	28,608	12	28,607	12.0
Rubble	2,141	1.1	4,333	1.8	5,245	2.2
Timber	1,519	0.8	1,582	0.6	3,814	1.6

	2011		2016		2023	
Waste Category (SWAP)	Tonnes	%	Tonnes	%	Tonnes	%
Rubber	205	0.1	739	0.3	954	0.4
Potentially hazardous	1,449	0.7	2,818	1.2	3,338	1.4
E-waste[9]	unknown	-	1,642	0.7	Weight unknown (413 items counted)	-
Total	**194,563**		**243,609**		**238,394**	

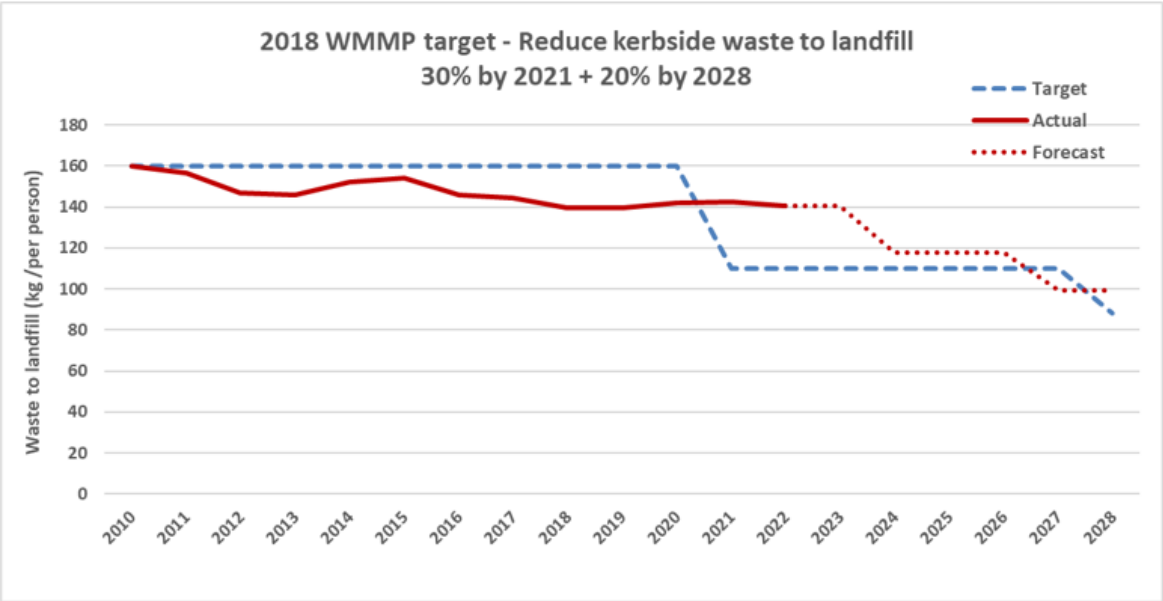
After organics (largely consisting of food), the next largest waste stream by weight is nappies and sanitary products, at 12 per cent. It is anticipated this waste stream will increase significantly as a percentage of kerbside refuse once the rukenga kai/food scraps service is fully implemented and the amount of organic material reduces. Plastics and garden waste are anticipated to also continue to have a considerable presence in the kerbside refuse.

It is also worth noting the further breakdown of the following waste categories from the SWAPs of kerbside refuse bins:

- Plastics - consisted of 51 per cent plastic bags and film, 24 per cent recyclable containers (resin no. 1, 2 and 5) and 24 per cent non-recyclable plastics. 1 per cent were containers made from resin no. 3, 4, 6 and 7 which are no longer to be collected in council kerbside recycling collections from February 2024 under new government regulations. The plastic packaging product stewardship scheme is likely to lead to increased diversion potential for some of these materials and at a minimum, an obligation for producers to cover the cost of recovery. Auckland Council would like to support business to identify opportunities for source reduction strategies, including improving the uptake of packaging reuse and refilling initiatives.
- Paper – consisted of 72 per cent recyclable paper such as newspaper, office paper, magazines, junk mail, paper packaging, liquid paperboard packaging, cardboard and envelopes. There is scope for greater source reduction of paper through better design considerations as discussed above.
- The most common E-waste items (by number and not by weight) were batteries and vapes. Noting that since this analysis was completed, legislation banning most disposable vapes has been announced, coming into effect towards the end of 2023.
- This total waste to landfill from kerbside collections gives a per capita figure of 141 kg/person/annum in 2022.

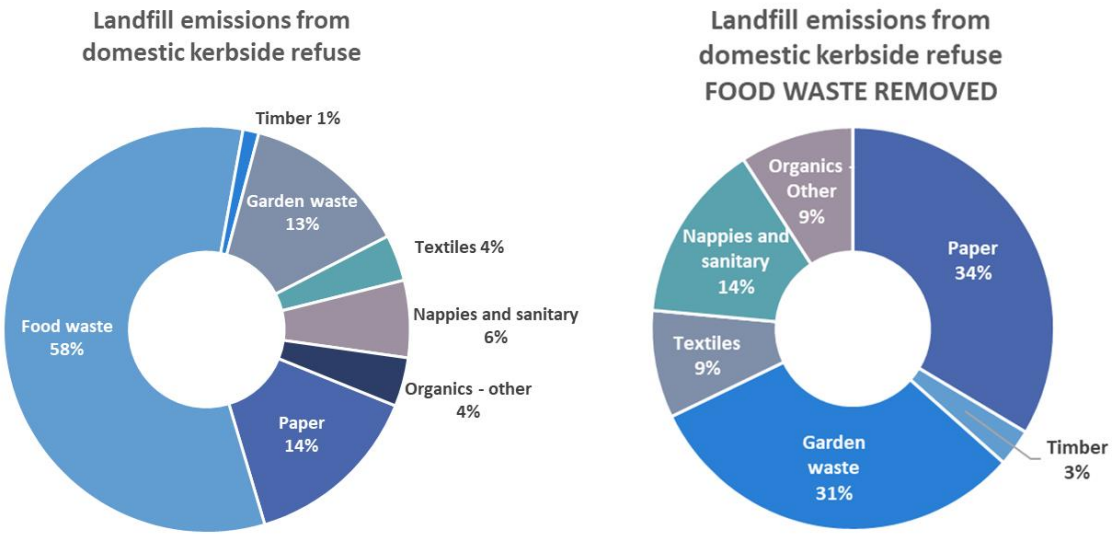
[9] E-waste is also included in the tonnes of potentially hazardous waste

Figure 8 Kerbside annual waste to landfill per capita



- Note that the step drop in targeted waste to landfill per capita in 2020-21 aligned with the anticipated introduction of the rukenga kai/food scraps kerbside collection, now being rolled out in 2023. The actual waste to landfill per capita has remained fairly steady since 2017.
- Total emissions from kerbside collected refuse are shown below both with and without food scraps. The removal of food scraps entirely has a significant impact on the contributions to emissions from kerbside refuse. Garden waste (31 per cent) is a significant contributor to emissions, along with paper as discussed above. Nappies and sanitary (14 per cent) and textiles (9 per cent) are two waste streams where source reduction and diversion options are currently either limited or non-existent however these waste streams could benefit significantly from increased attention, funding and policy support, which Auckland Council can contribute to through its action plan.

Figure 9 Emissions from kerbside refuse with and without food scraps



4.3.7 Refuse from Multi Unit Developments

2018 data showed that 19 per cent of Auckland's housing stock five years ago was some form of multi-unit or detached dwelling, these can be in the form of terraced houses or low-rise flats, as well as higher density apartment buildings.

The proportion of Aucklanders living in multi-unit developments in the future is likely to increase with a new Future Development Strategy designed to encourage infill housing within existing suburbs and close to public transport networks. Based on consent data to 2023, apartments alone made up 18 per cent of new consent applications, while attached townhouses, flats and units made up 37 per cent of new applications, and standalone houses 44 per cent.

For many Multi Unit Developments (MUDs) it is not feasible to use 120- and 240-litre wheelie bins and set them out once a week. Larger bins and more frequent collections are required resulting in communal bins (i.e. not assigned to a particular unit or resident). Communal bins can be collected more than once per week, and residents may not deposit waste into communal bins every day. This means samples taken on any given day may not be a true representation of the refuse generated by the residents.

Based on a limited sample of MUDs carried out in November 2022[10], the average weekly refuse disposed of per resident was 2.5 kg/week. Extrapolating this over a year, gives an indicative annual kg per capita of 130 kg/capita.

There are multiple assumptions behind this figure, including daily and seasonal variability in refuse quantities, variability between MUDs and the estimated total residents within the MUDs sampled. Though the figure is only indicative it is in a similar range to the annual refuse per capita in the kerbside collection, though slightly lower, which is to be expected as MUDs generally have less external space to maintain.

[10] "MUD Waste Audit Report" by Sunshine Yates Consulting Limited, February 2023.

Food scraps were at very similar levels as the kerbside refuse service, ranging from 34.7 - 52.2 per cent, compared to 41 per cent of kerbside refuse (74 per cent of the 55 per cent Organics in Table 8) with negligible green waste.

For the purpose of future waste generation estimates, the annual refuse tonnes per capita in MUDs is assumed to be the same as those receiving a kerbside refuse collection due to the limited availability of any evidence to the contrary.

4.3.8 City Centre (Inner CBD) Refuse

Council provides a specific collection service for waste generated in the city centre. Every rateable property in the city centre (inner CBD) is supplied with 104 x 60-litre orange rubbish bags annually (the equivalent of 120-litres per week).

An audit of refuse bags was carried out over two days in June 2023[11]. The results of the audit showed the refuse bags weighed 4.19kg each on average between the morning and evening collections. They contained 16.4 per cent recyclable material and 50 per cent compostable material, comprised entirely of food scraps.

The largest portion of the recyclable material was recyclable paper, in similar quantities to the regular kerbside refuse collection service.

4.4 Diverted materials

This section contains information about known sources of diverted materials generated and recycled or recovered in the Auckland region. Auckland Council also has some data on reuse activities through the Resource Recovery Network and the inorganics service, however overall reuse activity in Auckland is not widely measured partly due to the many different reuse activities that happen within the region and beyond, for example repair services, repair cafes, second-hand stores, Trademe, CivilShare, Mutu, Facebook Marketplace and other online platforms. None of the goods reused through these activities are quantified in this Waste Assessment.

Auckland Council would like to further explore reuse as a form of diversion, particularly building the understanding of community and business around its contribution to a more circular economy and growing the opportunities for reuse activities to thrive in the Auckland region. There are existing methodologies for measuring the impact of reuse activities emerging overseas which Auckland Council can adopt, for example New York City's Reuse Impact Calculator, and the United States Environmentally-Extended Input-Output model which was used by Reuse Minnesota and Eunomia UK to develop an assessment tool which measured environmental (waste, emissions, water), economic (revenue), and social outcomes (jobs created within the reuse sector).

4.4.1 Tonnage and composition of known diverted materials

This section presents an overview of the total range of materials diverted from landfill, cleanfill or managed fill on an annual basis – with much of that diversion undertaken by the private sector. Diversion is through reprocessing into other materials of value/ use, including exporting for offshore recycling.

[11] "ICBD Recycling Audit Report" by Sunshine Yates Consulting Limited, November 2022.

Over the previous few years, Eunomia Research and Consulting Ltd has undertaken a national stocktake of solid waste processing and disposal infrastructure and services on behalf of the MfE[12]. Much of the national research and analysis was undertaken using 2020 waste data and is the most thorough account of total diverted materials available. The figures presented in the table below represent an extraction of the Auckland region's information from the national report, supplemented with additional information where possible, including specific research Eunomia undertook for council in 2023 to quantify plastics recovery (Appendix H.1).

The 2010 tonnages presented in the table below are based on estimated figures obtained via the Auckland Waste Stocktake and Strategic Assessment 2009[13], as published in council's Waste Assessment 2011. The 2016 estimates presented in the table are taken from council's Waste Assessment 2017 and are based on a combination of publicly available information (including the 2010 figures) and discussions with key collectors or processors of materials.

The total annual quantity of diverted materials is estimated as 1.5 million tonnes. This remains relatively similar to previous years, however the data indicates large individual increases in diverted tonnes of plastics, glass, and wood waste have occurred since 2016, with slight reductions in the quantities of paper/cardboard, scrap metal, and 'Other' materials.

The increase in glass diversion is not reflected in kerbside recycling as shown in Chapter 4.4.2, rather the increase is due to an increase in the tonnes of flat glass recovered, while bottle glass recovery has remained fairly static since 2016.

Quantities and flows of plastics diversion were analysed in more depth for this waste assessment, given plastic wastes has been receiving significant global and national focus in recent years. For example:

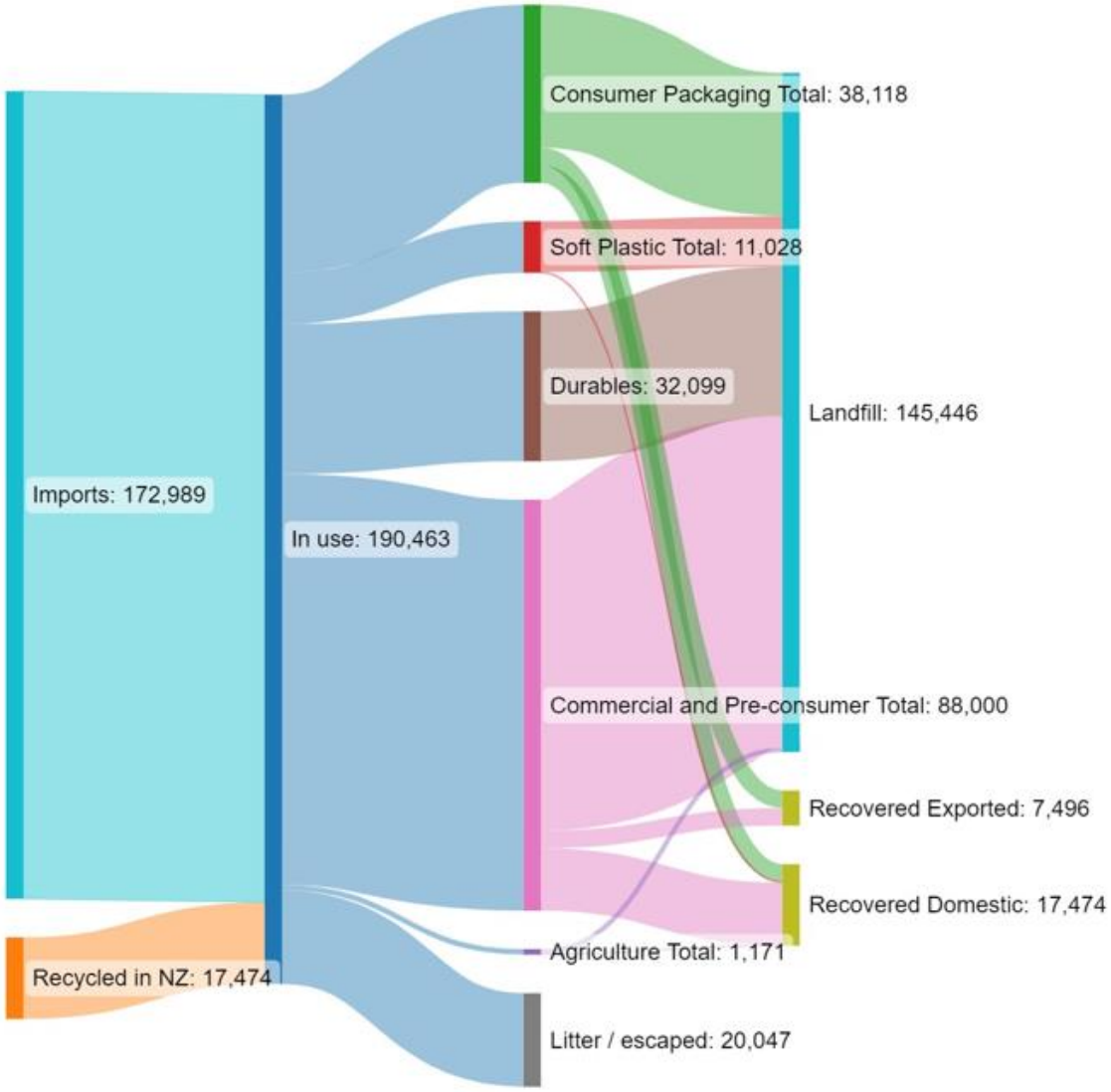
- The Prime Minister's Chief Science Advisor's research project, Rethinking Plastics, in 2019.
- The Ministry for the Environment's work programme on plastics, including the National Plastics Action Plan released in 2021 and the launch of the government's Plastics Innovation Fund soon after.
- Current negotiations on the UN Global Plastics Treaty.
- ESR Science's research on microplastics in the marine and freshwater environments.

The total quantity of recovered plastic has increased by 36 per cent since 2016 and is predominately made up of consumer and commercial packaging, although overall only 13 per cent of plastics consumed in Auckland annually is estimated to be recovered. Results are presented in Appendix H.1 and summarised in the figure below.

[12] "Waste and Resource Recovery Infrastructure and Service Stocktake and Gap Analysis" by Eunomia Research and Consulting Ltd, March 2023

[13] Auckland Waste Stocktake and Strategic Assessment 2009, Auckland Regional Council (TR 2009/17), 2009

Figure 10 *Plastic Waste Streams in Auckland*



Wood waste recovered has increased 52 per cent compared to 2016, however this waste stream dropped between 2010 and 2016, so this increase brings it back to slightly above 2010 levels. For some materials, such as those that sit within the C&D waste category (wood waste, concrete and scrap metal), diversion quantities vary with the number and scale of large demolition projects occurring as well as the number, scale and location of sites that can make use of the recovered material. For example, the capacity of the Auckland market for recycled aggregate as fill/drainage material will vary with the timing and phase of large-scale developments. Other limiting factors may include the availability of suitable land to store crushed concrete pre-use, regulatory restrictions around use of the recycled material (for example, restrictions on use as roading aggregate), and relatively low product values.

Note that the organic waste quantity shown in the table below does not include any impacts from council's recently introduced kerbside rukenga kai/ food scraps collection service.

Table 12 Estimated total diverted tonnes from disposal facilities

Material	2010 tonnes	2016 tonnes	2020 tonnes	% of Total	% change	Commentary	Sources
Commodities	**247,000**	**271,019**	**298,566**	**20%**	*10%*		
Plastics	11,000	18,380	24,970	2%	*36%*	The plastics data is more recent (2023) as it is based on data gathered through a separate plastics investigation for council. This total includes pre consumer, post-consumer and commercial plastics.	From plastics investigation refer Appendix H.1
Glass	68,000	51,516	82,796	5%	*61%*	Approximately 55k is bottle glass and the rest is flat glass. Increase is essentially flat glass recovery	Based on Glass Packaging Forum and national stocktake data
Paper/Card	160,000	194,246	183,300	12%	*-6%*	Includes locally processed and export material	Based on national stocktake data
Cans	8,000	6,877	7,500	0%	*9%*	Includes aluminium and tin/steel cans	Estimate based on MRF quantities
Wood waste	**60,000**	**46,000**	**70,000**	**5%**	*52%*	Mulch, animal bedding, and wood waste to the Golden Bay cement kiln.	Based on national stocktake data, and industry estimates
Organic waste	**192,000**	**173,723**	**190,100**	**12%**	*9%*		
Composting	82,000	74,723	80,200	5%	*7%*	Predominantly composting to Living Earth and Envirofert. It does not include food waste to EcoGas.	Based on national stocktake data
Other recovery	110,000	99,000	109,900	7%	*11%*	Animal feed, rendering.	National stocktake data plus rendering figure based on 2015 data
Aggregate	**980,000**	**656,000**	**702,500**	**46%**	*7%*	Aggregate recovered (e.g. crushed concrete, asphalt, glass, industrial slag) - ie not to class 1 to 5 landfills. The quantity recovered from NZ	Industry data, national stocktake data and NZ Steel information[14].

[14] https://www.nzsteel.co.nz/sustainability/our-environment/redefining-waste/

Material	2010 tonnes	2016 tonnes	2020 tonnes	% of Total	% change	Commentary	Sources
						Steel (reported to be approximately 445,000 tonnes) has a large impact on overall recovery rates.	
Scrap Metal	**176,000**	**224,000**	**215,833**	**14%**	*-4%*	Scrap metal data is difficult to pin to a location as it gets moved around. Majority is exported to offshore markets.	National stocktake data, prorated to Auckland (cans subtracted)
Concrete		**18,000**	**18,000**	**1%**	*0%*	No new data, but c existing diversion schemes are continuing.	2016 figure carried forward and reflects Envirocon's reported tonnages[15].
Other	**12,000**	**76,000**	**36,025**	**2%**	*-53%*	Includes e-waste, tyres, used oil, plasterboard	Various sources, national stocktake data, MfE used oil information, and estimates from industry data.
TOTAL	**1,667,000**	**1,464,742**	**1,531,025**	**100%**	***5%***		

[15] https://www.envirocon.co.nz/pages/about

4.4.2 Kerbside recycling

The 2011 data presented below represents kerbside recycling tonnages from the first complete year of Auckland Council's operation (2011). The 2016 and 2022 figures represent kerbside recycling tonnages processed at the Onehunga Materials Recovery Facility (MRF).

In 2022, the Onehunga MRF was closed for a three-month period while the facilities were upgraded. Data for 2022 therefore covers only the 9-month period when the MRF was operational. This makes comparisons with historical percentages of materials collected more meaningful than total tonnages.

Table 13 Domestic kerbside recycling composition for the Auckland region

	2011		2016		2022	
Material	**Tonnes**	**%**	**Tonnes**	**%**	**Tonnes**	**%**
HDPE	1,658	1.3%	1,039	0.8%	1,468	1.4%
PET	1,806	1.4%	4,077	3.1%	2,827	2.6%
PP	-		-		424	0.4%
Mixed plastic	5,214	4.0%	2,056	1.5%	1,115	1.0%
Subtotal plastics	**8,678**	**6.7%**	**7,172**	**5.4%**	**4,719**	**4.4%**
Aluminium cans	572	0.4%	571	0.4%	1,195	1.1%
Steel cans	3,448	2.7%	5,105	3.8%	3,090	2.9%
Paper/cardboard	62,939	48%	57,246	43%	44,775	41%
Glass	48,163	37%	45,916	35%	35,009	32%
Contamination	6,241	4.8%	16,929	12%	18,287	17%
Total	**130,042**		**132,940**		**107,075**[16]	

In the table above, data prior to 2022 included polypropylene (resin #5, PP) in the 'Mixed plastic' reporting. However, in the period from 2018-2023 the markets for plastics #3, 4, 6 and 7 have reduced to such an extent that these no longer have a viable market and must go to landfill. Recent investment in upgrading the sorting technology at the MRF has enabled polypropylene to be separated and quantities are now reported separately. Since 2016, the percentage of HDPE + PET has remained fairly constant, and so has the combined percentage of PP + Mixed Plastics. The inclusion of plastics #3, 4, 6 and 7 in the kerbside recycling collection is due to be phased out in 2024.

The percentage of aluminium cans collected has increased by 0.7 per cent and the percentage of steel cans has reduced by a similar amount, potentially indicating a change in material preference by manufacturers. There are no other significant changes in the other recycling categories.

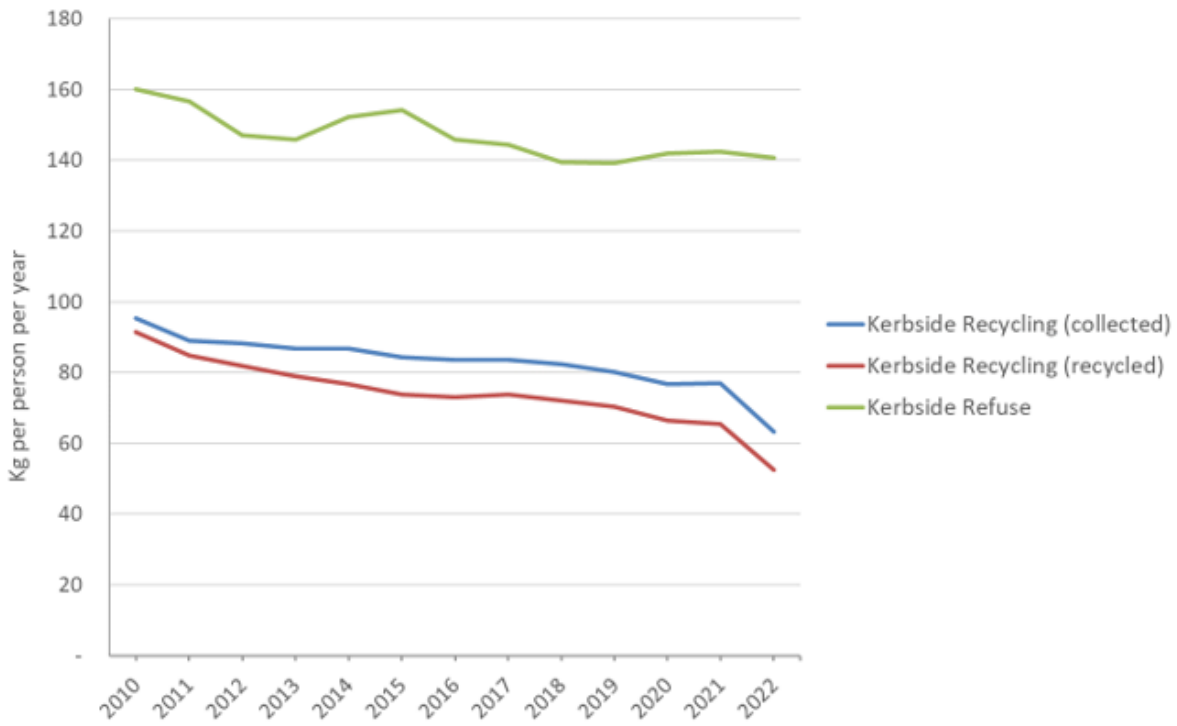
[16] Reduced tonnage in 2022 due to closure of the MRF for a 3-month period during upgrade. Assuming no variability month to month, an extrapolated 12 month figure would be close to 128,347t.

Figure 11 shows trends in domestic kerbside recycling across the Auckland region per capita. Refuse collected from kerbside is also shown in the figures for comparative purposes.

In Figure 11, the difference between *Kerbside Recycling (collected)* and *Kerbside Recycling (recycled)* shows the contamination level, as measured at the MRF recycling facility. Note the sharp drop in 2022 recycling figures is due to the three-month shutdown period during the upgrade of the MRF. Data from 2020 and 2021 may also be affected by extended Covid-19 lockdowns during this period.

Addressing contamination within kerbside recycling bins was an area of focus for the council in the 2018 WMMP and is recommended to continue. This is reflected by the proposed options in Chapter 8.

Figure 11 Kerbside refuse and recycling per capita



Between 2016 and 2019 kerbside recycling per capita appears to be trending downwards at a slower rate than kerbside refuse per capita. Then, in 2019-2021 kerbside recycling per capita continues to trend downwards while kerbside refuse per capita begins to trend upwards. Though 2019 was pre-Covid-19, it is difficult to say how these years were impacted with any certainty. In 2022, the first year without extended Covid-19 lockdowns, the kerbside refuse per capita has begun trending downwards again.

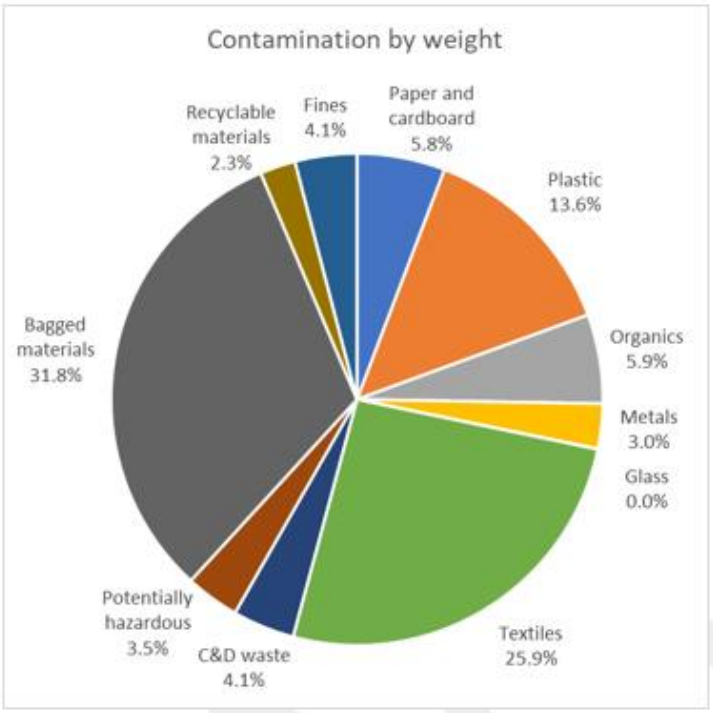
Contamination has continued to increase through 2022, however this is partly due to the upgraded MRF producing a much higher quality of sorted product and removing more contamination from the incoming recycling material collected from the kerbside. This improves the saleability of the sorted recyclables but increases the residual material (contamination) for disposal.

Contamination is a function of changes in recycling processes, market acceptance requirements and incorrect householder behaviour. Contamination reduces the quality of the material council is relying on selling to cover some of the cost of recycling, including the costs to first separate and then landfill the residual materials. Competition for end markets, both locally and internationally, and fluctuating commodity prices means that markets availability and acceptable contamination limits are not guaranteed.

Elevated contamination levels have been experienced in the current year (2023) based on year-to-date information (to July 2023) received from council's recycling processing contractor, averaging 23 per cent by weight of total tonnage of material processed.

A contamination study conducted in 2021[17] (included in Appendix B.5) showed that the largest form of contamination was bagged materials (31.8 per cent of total contamination by weight). This bagged material consisted mainly of refuse, rather than bagged recyclables. The second largest form of contamination found was loose textiles (25.9 per cent by weight) though many bags of textiles were also identified and classified as 'bagged materials'. Due to health and safety risks and operational constraints, bagged materials that are put in kerbside recycling bins cannot be opened and sorted at the Onehunga MRF.

Figure 12 Composition of contamination in kerbside recyclables



4.4.3 MUD recycling collections

Similar to refuse, for many MUDs it is not feasible to use 120- and 240-litre wheelie bins for recyclables and set them out once a fortnight. Larger bins and more frequent collections are required resulting in communal bins (i.e. not assigned to a particular unit or resident). It is also common for MUDs to have separate cardboard receptacles alongside a co-mingled receptacle for all other recyclables. This section includes information collected around communal recycling bins in a sample of MUDs during November 2022.[18]

[17] "Contamination Audit Results April 2021" by Sunshine Yates Consulting Limited
[18] "MUD Waste Audit Report" by Sunshine Yates Consulting Limited, February 2023.

At the MUDs sampled, there was very little (<1 per cent) contamination in the cardboard receptacles where these were available. Contamination in comingled recycling receptacles ranged from 11 per cent to 24 per cent (with an outlier of 1 per cent) suggesting that the kerbside recycling collection average of 17 per cent contamination is a fair representation of MUD contamination as well.

It was not possible to draw any conclusions about the relative contamination levels due to the different sized recycling bins, however the overall composition of materials across refuse and recycling were generally consistent with the composition seen in the kerbside collections.

4.4.4 City Centre Recycling

Council provides a specific collection service for recycling generated in the city centre. Every rateable property in the city centre is supplied with 156 clear recycling bags annually. Cardboard is not required to be bagged and is collected loose.

An audit of cardboard and recycling bags was carried out in October 2022[19]. The results of the audit (Appendix B.2) showed the recycling bags were 28.5 per cent contaminated (by weight) which is significantly higher than the regular kerbside recycling collection. Previously in 2015, contamination levels in city centre bags was measured at 26.2 per cent and a targeted education campaign reduced this to 12.9 per cent in the same year.

The more recent audit indicates since 2015, contamination in these recycling bags has reverted to previous levels.

4.4.5 Resource Recovery Network

Council's Resource Recovery Network has expanded substantially since the previous waste assessment. This is discussed further in Chapter 5.2.5.

Total tonnes diverted through the Community Recycling Centres within the RRN in 2022 are shown in the table below.

Table 14 Materials received through CRCs in 2022

Material type	Tonnes
Reuse (Shop & Yard)	1,620
Recyclables	3,120
Organics	2,261
Hazardous waste	22
Residual	1,983
Total	**9,005**

[19] "ICBD Recycling Audit Report" by Sunshine Yates Consulting Limited, November 2022.

Material type	Tonnes
Total Diverted	**7,000**
Diversion rate	**78%**

Note that most CRC sites only accept divertible materials and do not accept any residuals.

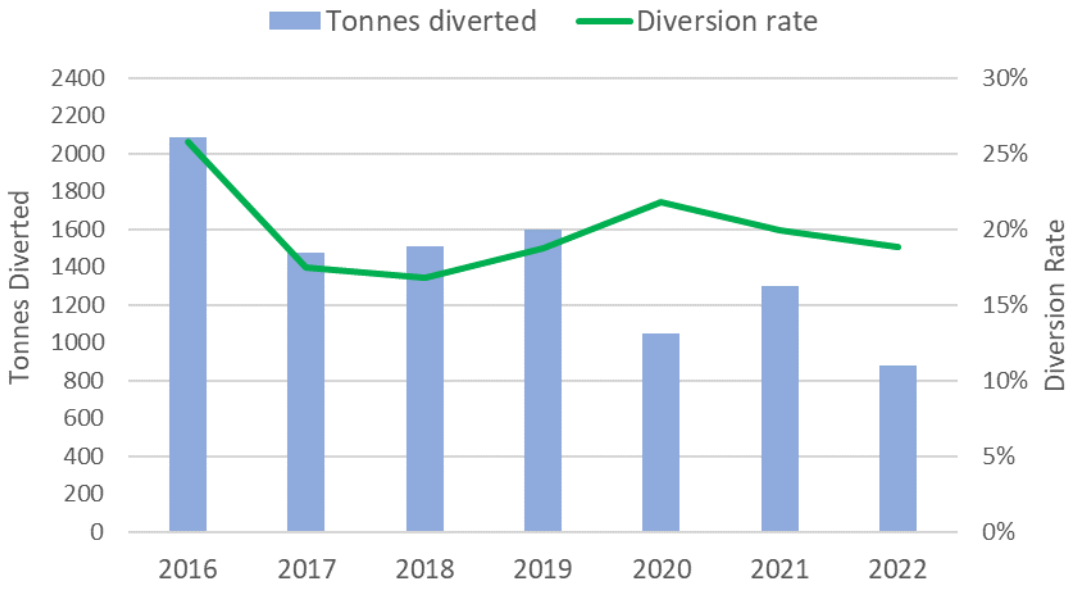
4.4.6 Inorganic Collection Service

The council's inorganic collection service for ratepayers is described in Chapter 5.2.3.

Auckland Council is required, under Section 44 of the Waste Minimisation Act 2008 to have regard to the priority order of the waste hierarchy. The inorganics service is another area where Council is able to do this, through the prioritisation of reuse. Both of the council's inorganics service suppliers remain committed to a 30 per cent diversion target, half of which will be targeting reusable items, reflecting the priority placed on the upper tier of the waste hierarchy.

During the inorganic collection service's first full year in 2016, the service diverted over 2,000 tonnes of material from landfill representing 26 per cent of all material collected. Since then, diversion rates have reduced (ranging between 17 per cent and 22 per cent) with annual diverted quantities of between approximately 880 and 1,600 tonnes.

Figure 13 Tonnes diverted through the inorganic collection service



The inorganics collection service was significantly impacted by Covid-19 in 2020-21 with collection bookings cancelled, or collections rescheduled for later in the calendar year or contract term. The low tonnages reported in 2022 were also due to a three-month period when the service could not operate across the whole region due to changes with the supplier contracts and impacts from rescheduled bookings.

4.4.7 Hazardous wastes

Auckland's economy relies on industrial activities which contribute to GDP, but these activities have the potential to generate significant tonnages of hazardous waste as a by-product of those activities, for example timber treatment, electroplating, pesticide application, solvents use, and commercial paint applications.

The most common types of hazardous wastes include:

- organic liquids, such as those removed from septic tanks and industrial cesspits
- solvents and oils, particularly those containing volatile organic compounds
- hydrocarbon-containing wastes, such as inks, glues, and greases
- contaminated soils
- chemical wastes, such as pesticides and agricultural chemicals
- medical and quarantine wastes
- wastes containing heavy metals, such as timber preservatives
- contaminated packaging associated with these wastes
- gas cylinders.

Despite the risk that these hazardous substances present to the environment and the community, Auckland Council has been unable to accurately quantify and report on the tonnages of hazardous waste being generated within its jurisdiction.

This is due in part to the lack of reliable reporting on tonnages of hazardous waste generation and the fate of those substances, which itself is the result of an incoherent and fragmented framework of legislation governing responsibilities, and a lack of mandatory waste tracking by actors in the industry.

License data that Auckland Council can access shows that in 2022, there were 12 licensed facilities within the region who received more than 46,000 tonnes of hazardous waste before the waste was either treated and disposed of domestically or shipped offshore for further treatment and disposal.

In 2022, 303,851 tonnes of waste went to landfill under the classification 'potentially hazardous waste' however Auckland Council is unable to obtain further data on what the sub-classifications of these wastes were.

Auckland Council's Waste Solutions Department has limited data which is collected through the Waste Licensing system under the Waste Management and Minimisation Bylaw 2019, but this only includes tonnes reported as having been collected for treatment and disposal, not what is generated overall within the region.

This section summarises the known diversion of hazardous waste but also acknowledges that actual volumes of hazardous waste both generated and diverted are unknown to council, though the composition of waste to landfill suggests there is potential for more diversion in this area.

Table 15 provides an overview of the amount of hazardous waste either collected by council or by others on behalf of the council through the refuse transfer stations.

Table 15 Hazardous waste collection by/on behalf of Auckland Council (kg / litres)

Category	2018	2019	2020	2021	2022
Class 2 (aerosols)				545	1,155
Class 3 (flammable liquids – solvents)	4,157	5,858	6,020	7,731	1,444
Class 4 (flammable solids – hexamine, magnesium powder)				5	6
Class 5.1 (oxidizing waste)	506	1	278	414	267
Class 5.2 (organic peroxides)				9	5
Class 6 (toxic waste – glycol, waste paste, diphacinone)	698	507	610	459	
Class 6.1 (toxic waste – cyanide waste)	1		35		
Class 8 (corrosive liquids –ammonia, ferric chloride, hydrofluoric acid, pickling paste, acids, alkalines)	1,255	1,038	972	940	727
general household chemicals	1,903	1,489	1,271	3,878	4,423
intractables/ intractable pesticides	231	352		348	327
pesticides	1,606	934	1,861	2,494	1,823
Other (alkaline batteries, assorted classes, fire extinguisher powder, moly bentone grease, lab chemicals, poisons, water-based cleaning chemicals)		222	148	142	125
TOTAL	**24,397**	**26,330**	**24,877**	**65,166**	**45,396**

Council also received on average 25,390L of paint per year between 2018 and 2022.

Previous waste assessments have reported hazardous waste collected through Refuse Transfer Stations as overall tonnes, with 2008 totalling 23.2 tonnes and 2016 totalling 16 tonnes.

Collected by licensed waste collectors

The following table summarises the total hazardous waste reported to council from licensed collectors. Data has been aggregated to protect commercial sensitivities.

Table 16 Hazardous waste reported by licensed collectors

Total tonnes reported				
2018	2019	2020	2021	2022
42,114	35,613	43,713	43,598	46,295

Licensed waste collectors in Auckland identify the categories of waste they will be collecting, including whether they will be collecting hazardous material. From 2023 onwards, because of changes to Auckland Council's reporting requirements, licensed collectors will be reporting in more detailed categories of hazardous waste.

Product stewardship schemes

There are a number of voluntary accredited product stewardship schemes operating in the Auckland region as detailed in Chapter 5.6. These schemes do not report to council so actual numbers/tonnages of hazardous waste diverted through these schemes is not available for this waste assessment. However, the following minimums have been derived through publicly available information and information voluntarily supplied to Council. This does not represent the full extent of materials diverted through product stewardship schemes and this lack of access to data has been identified as an area for advocacy in the next six years. Product stewardship schemes, whether voluntary or mandatory, must include mandatory public reporting of data to enable transparency and accountability of scheme performance.

Table 17 Known hazardous waste diverted through product stewardship schemes

Waste	Average annual collection
Car batteries	2820 units
Misc. batteries (excl cars)	138 tonnes
E-waste	2,482 tonnes
Agrichemicals and their containers	27 tonnes
Paint	500 tonnes[20]

Diversion potential

It is not known how much hazardous household waste is being generated by Auckland households overall, but the results of the kerbside refuse and recycling collections presented in previous sections show that around 1.4 per cent of kerbside refuse collected and 0.5 per cent of kerbside recycling material would be more appropriately diverted through an avenue suited to hazardous waste.

The above figures do not differentiate between domestic and commercial so the diversion potential in the commercial waste is unknown, however the 21 per cent of total reported waste to landfill that is classified as special waste / potentially hazardous material indicates there is room for further diversion from commercial activities.

4.5 Council's in-house activities

Council is committed to "Walking the Talk" when it comes to reducing waste and greenhouse gas emissions across all Auckland Council Group activities, this includes the council, council-controlled organisations (CCOs), subsidiaries, associates and joint ventures.

[20] This number is from 2020-21 and has been derived from the Resene Paintwise programme manager 3R Group.

This section specifically reports on council group's activities in these areas, separated into three parts:

- The performance of Council overall against the targets set for in-house waste reduction and reporting in the 2018 WMMP.
- Operational wastes, including biosolids
- How the solid waste activity is contributing to council's goals and targets for greenhouse gas emissions (to halve emissions by 2030 and reach net zero emissions by 2050) set by the Auckland Council Group's Sustainability Guidelines.

4.5.1 Council-wide in-house waste reduction

An identified action in the 2018 WMMP was for council to lead by example in council's own operations towards achieving the vision of being Zero Waste by 2040. This covered council performance measures, council and CCO procurement, council and CCO waste streams, and events. The 2018 WMMP included the following targets for council:

- Target 1: Reduce council's own in-house office waste by 60 per cent per capita by 2024 from a 2012 baseline. i.e. Reduce waste from 0.75kg to 0.3kg per FTE staff member per week by 2024, and
- Target 2: Work across council to set a baseline for operational wastes and, by 2019, put in place targets for reduction.

In-house office waste refers to material sent to landfill that is generated by council staff in corporate council office buildings. Operational waste refers to material sent to landfill that is generated by all activities across the council group and council-controlled organisations.

Target 1 – In-house office waste:

Council has enabled source separation of waste streams across council offices and administration buildings by providing bins/consolidation points for the following waste streams:

- refuse
- food scraps and compostable packaging
- mixed recycling (plastics #1, 2, 5, glass and metal containers)
- paper (separate for document destruction)

In light of MfE's 2022 position[21] that industry, businesses and the general public should take a cautious approach when considering using compostable products, Auckland Council will continue to review how these are offered in the workplace, and whether these can be incrementally replaced by reusable and refillable containers.

In addition, separate waste stream bins/consolidation points are provided in specific locations or being trialled for the following:

- cardboard
- polystyrene

[21] https://environment.govt.nz/news/ministry-position-on-compostable-products/

- soft plastics
- batteries
- uniforms
- worm farms (in Albert St)
- New practices have been introduced to minimise the generation of office waste at different stages of product lifecycles and to leverage council group's purchasing power to increase the durability and sustainability of operational supplies:
- usable IT devices are sent for redistribution through charity groups,
- end-of-life IT devices and peripherals processed through an e-waste recycler,
- moving to longer lasting solutions like rechargeable batteries and paper rather than plastic packaging,
- exploring reduction of textile waste working first at the procurement level as well as through reuse and repair of uniforms in the first instance before recycling those at end-of-life, and
- separating milk bottles for a closed loop recycling model.

An audit of in-house office waste was undertaken in 2019 which showed an encouraging reduction of waste against the 2012 baseline, shown in the table below.

Table 18 In-house office waste 2011-2019

Year audit undertaken	Waste per FTE per week (kg)			
	Albert Street	Bledisloe House	Pacific Tasman	Average
2011	Not reported	0.59	0.62	0.60
2015	Not reported	0.39	0.34	0.38
2019	0.57	0.23	0.32	0.42

Note that the council buildings audited in 2011, 2015 and 2019 have changed. The original 2011 audit included the Civic and Town Hall, Graham Street and the Manukau Civic in addition to those shown (giving the original 0.75kg benchmark). The Albert St building was included in the 2019 audit for the first time. Without the Albert St building, average waste per FTE per week for Bledisloe House and Pacific Tasman is 0.23kg, below the target, however this highlights the importance of capturing and monitoring all council office activities for effective waste reduction.

The impact of Covid-19 on work patterns from 2020 onwards has presented a challenge for further comparison. Remote and flexible working have become the norm, which has directly affected the tonnages of office waste. In 2018 when the target was developed, the number of FTEs was a relatively stable metric to use for calculating waste per capita from council buildings. From 2020 onwards, a more relevant metric is visitation to offices based on swipe-card access.

An analysis of average refuse per month based on contractor reporting against visitation in 2022 is shown in Figure 14 below.

Figure 14 Refuse per visit during 2022 across Auckland House, Orewa and Manukau locations

As explained above, comparison between the 2012 and 2022 data is compromised by the different methodologies. Note that locations have also changed due to changes in council office locations over the extended period.

Target 2 – Operational waste:

Waste reduction targets, objectives and guidance were established in 2019 as part of the Auckland Council Group Sustainable Procurement Framework. The goal of zero waste by 2040 is identified as one of five objectives within the framework. The target is for 100 per cent of contracts to incorporate waste considerations in all procurement processes. With this approach, the council had embedded waste minimisation considerations in 20 per cent of its sourcing events and contracts in FY21. However, there remains a lack of clear information on measures employed, and waste minimisation achieved as a result of these changes.

Work has begun to collate data from across council departments and CCOs where significant volumes of waste are generated so that operational baselines and targets can be set. Data supplied to date reveals many differences in the ways that data is reported and recorded across Council units and CCOs. The difficulty of collating and comparing data sets is compounded by the diversity of activities and waste types that contribute to operational waste streams. While specific waste streams and activities can be linked with diversion (e.g. composted material from parks) and/or to landfill (e.g. silts and contaminants from clearing stormwater treatment devices) there are still gaps in the information for various activities and waste streams that need further investigation. Initial findings from available data across the Auckland Council Group confirm that the most significant waste streams (including diverted material) are likely to be from wastewater treatment (biosolids), excavation and from construction and demolition activities. Identifying key waste streams by source and volume will be more meaningful once comprehensive, standardised reporting requirements are established.

Some examples of waste minimisation across council and CCO operational activities include:

- **City Rail Link**: The City Rail Link project (funded by central government and Auckland Council) is a benchmark-setting project for sustainable infrastructure in New Zealand. The project has used the Infrastructure Sustainability Council standard, obtaining certification with an 'Excellent' and a 'Leading' as built rating in 2021 and 2022 respectively. One of the five key

focus areas of the project's Sustainability Strategy is Zero Waste to Landfill. CRL Ltd and Link Alliance have diverted 96 per cent of all C&D waste from landfill, which rises to 99 per cent with spoil included.

- **Eke Panuku**: In late 2021, Eke Panuku published their own sustainable procurement strategy, which included adopting deconstruction as the preferred methodology for all physical works projects moving forward.
- **Healthy Waters**: Significant waste from capital works and ongoing maintenance and repair of the stormwater network has led to a programme to reduce waste in collaboration with designers and suppliers. This includes designing out waste, employing waste management plans for all projects with regular review, and recording data on quantities of materials diverted.
- **Eastern Busway**: Waste minimisation has been a focus for Auckland Transport's Eastern Busway project including deconstruction and salvage of materials from site clearances from around 130 homes in 2022 and early 2023. Results to date include 25 per cent of homes relocated, 80 per cent of waste diverted from landfill, and 2-3 per cent of materials re-used.
- **Materials Recovery Facility 2022 Upgrade**: For the upgrade of the Materials Recovery Facility in Onehunga, over 99 per cent of materials and equipment from the deconstruction was repurposed, reused or recycled. The bulk of equipment removed was sold to a local engineering company to be used in the construction of a future waste sort line. Total waste diversion from the deconstruction and installation was 188 tonnes, with only 0.3 tonnes landfilled.

4.5.2 Specific operational wastes, including biosolids

Identifying key waste streams from Auckland Council Group, by source, volume, and impact (such as carbon emissions) will be more meaningful once comprehensive, standardised reporting requirements are established. In the meantime, initial findings from available data across the Auckland Council Group confirm that the most significant waste streams (including diverted material) from council's operations are wastewater treatment biosolids and materials generated from construction and demolition activities, including soils. Information relating to soils and C&D wastes are covered earlier in this chapter.

Biosolids is a putrescible residual material generated by treating Auckland's wastewater at wastewater treatments plants. Biosolids management is a high priority to both the Ministry for the Environment and Auckland Council, primarily because of the volume produced and associated carbon emissions, but also as it is a product that cannot be easily eliminated or reduced given it is a necessary residual from wastewater treatment.

There are 18 wastewater treatment plants operated by Watercare in the region, with the two largest plants located in Rosedale in the north and Mangere in the south. At the Mangere Wastewater Treatment Plant, about 330 tonnes of treated biosolids are produced each day (over 135,000 tonnes per year). This material is strengthened with lime and used to rehabilitate a former quarry site on Puketutu Island, located adjacent to the plant. This rehabilitation operation is a commitment between local iwi, Auckland Council, and the local community and is expected to continue into the early 2030s. The majority of biosolids from other wastewater treatment plants (approximately 23,000 tonnes in 2022) are currently disposed to Class 1 landfills, with the exception of biosolids from Watercare's plant at Army Bay in Whangaparāoa which are processed into a soil amendment product at a large-scale vermicomposting operation.

Biosolids production in the Auckland region is projected to reach more than 200,000 tonnes per year by 2030 as a result of population growth. This constitutes a significant quantity of waste that requires ongoing resource recovery and/or disposal options, especially once the current operation at Puketutu Island is completed. This future demand issue is discussed further in Chapters 6 and Chapter 8.

4.5.3 Greenhouse gas emissions from waste activities

Council has goals and targets for emissions reduction outlined in its Climate Plan and in council's Sustainable Procurement Framework, with initiatives underway to reach these targets. Many of these impact on the way council delivers the solid waste service and are described briefly in this section.

While this waste assessment is not intended to tackle the whole of the council's GHG emissions sources, it is important to note the important role that waste minimisation and a circular mindset brings to reducing an organisation's overall GHG emissions.

Following the waste hierarchy, the fewer new products an organisation purchases overall, the more durable those products are, and the greater the effort to extend their life through repair and thoughtful rehoming, the greater the emissions saving.

This way of thinking follows a consumption-based approach to quantify GHG emissions and specific research for this waste assessment reflects this approach i.e. *Textile Consumption and Waste Flows research* (Appendix I) and the *Auckland Food Map (Appendix F)*. The Climate Change Commission has recently emphasised the importance of including consumption-based emissions where possible, even though the NZ GHG Inventory is still based on production-based emissions.

The Auckland Council Uniforms benchmarking study completed in 2021 by Usedfully applied a consumption-based emissions methodology to estimate that council (excluding CCOs) supplies 7,000 garments to staff per annum through uniforms, and that this equates to 8.04 $kgCO_2e$ per employee per annum based on current material compositions. This figure is assumed to equally apply to employees in the waste activity[22].

Procurement

Council's Procurement team has developed a supplier portal to measure and report on all emissions as well as waste streams for council's largest ongoing operational contracts (in facilities management, waste management, pools and leisure centres operation, stormwater operational maintenance). Council's top 20 contracts are now being managed through this portal, representing 35 per cent of total operational spend and >50 per cent of our third party carbon and waste footprint for council operations.

4.6 Litter and illegal dumping

Auckland Council cleans up an average of 136 tonnes of illegally dumped items every month, and this collection service costs ratepayers an average of $2.6 million a year. The mostly commonly dumped items include tyres, mattresses, green waste, cardboard, whiteware, electronic items and bags of clothing and household rubbish.

"[22] Textile Audit and Sustainable Procurement Auckland Council" by Usedfully, September 2021

Shopping trolleys are also a frequently dumped item, which are managed through a Shopping Trolley Accord with the Retailers Association of New Zealand. Under the Accord, businesses who issue shopping trolleys to their customers are responsible for preventing them from leaving their premises, encouraging the public to report any trolleys that have been removed from their premises, collecting their own trolleys within 24 hours of them being reported dumped, and reimbursing Auckland Council for any costs incurred to retrieve and return them, should council have to collect them.

Information about litter that escapes into the environment (sources, types, quantities) is held by many different organisations, including various teams within council. Organisations, including Keep NZ Beautiful, Be a Tidy Kiwi, and Sustainable Coastlines' Litter Intelligence programme (which is Aotearoa's first national litter database) regularly publish national information and data on litter. These organisations, and other local initiatives that help to address the impacts of litter (e.g. community clean-up events), receive various forms of support from council.

The Litter Intelligence database[23] presents information on litter recorded at numerous locations across the country, including around 50 locations within Auckland. The database reports on the density of litter (i.e number of items per 1000m2), the types of materials, as well as a percentage of items made of plastic. According to information presented on the online database, just over 1 tonne of material (112,000 items) has been recorded for Auckland sites, and 68 per cent of items are made of plastic. Locations are typically categorised as being at the beach, in freshwater, or associated with stormwater locations.

In a 2022 National Survey on litter by Keep NZ Beautiful[24], most litter was found at 'Retail Sites', whereas higher levels of litter were recorded at 'Industrial Sites' in a previous survey from 2019. A Litter Audit was undertaken in 2021/2022 for Auckland Council by Be A Tidy Kiwi. Figures presenting the types of litter recorded from that survey are provided in Appendix H, and key findings as follows:

- Plastic dominates Auckland's litter at nearly 60 per cent from this survey, with single use plastics topping the lists.
- The vast majority of Auckland's litter is related to takeaways.
- The littering of cigarette butts has fallen by half since 2019 and chewing gum by a factor of 10.
- Facemasks featured in the litter counts, but not in any significant numbers. Like plastic bags, they are often wind-blown out of survey areas and get picked up by council contractors as part of scheduled litter picking duties.
- Observations suggest all demographics in all manner of economically diverse neighbourhoods engage in littering behaviour.

At the time of writing, Be a Tidy Kiwi is also undertaking a further litter assessment which follows a Clean Communities Assessment Tool (CCAT) methodology. This involves both an audit of litter in certain locations as well as observe people's litter habits alongside interviews.

[23] https://sustainablecoastlines.org/about/our-programmes/litter-intelligence/
[24] https://www.knzb.org.nz/resources/research/national-litter-audit-2022/

4.7 Waste from natural/human-made disasters

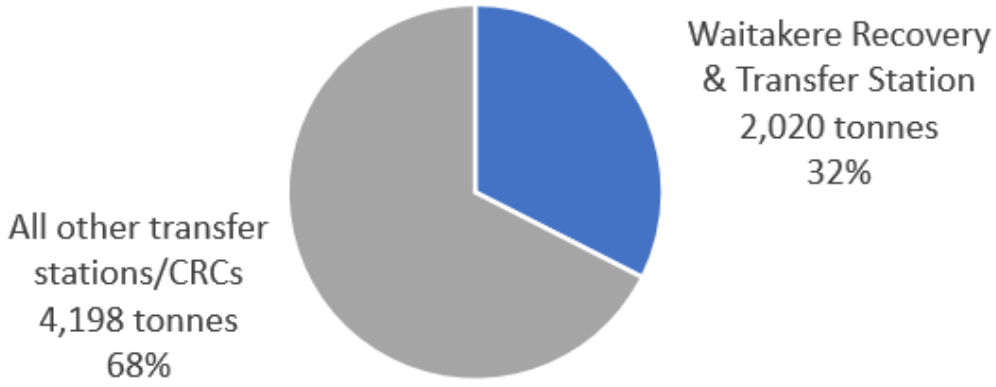
The management of wastes arising from natural or human-made disasters has created many issues for New Zealand councils. In recent years, Auckland has faced multiple climate, economic and public-health challenges which impact how waste is generated and/or managed. Waste generation can change during such crises, and Council's waste/resource recovery facilities and services can be impacted.

Two weather events impacted Auckland within sixteen days of each other in early 2023. On 27th January unprecedented rainfall caused flooding across the Auckland isthmus (the Auckland Anniversary Floods). On 12th February, while clean-up from the flooding was still underway, Cyclone Gabrielle hit, causing further widespread damage.

To help residents respond to the regionwide damage, Council's Waste Solutions Department established 15 drop off facilities for customers to take their storm-damaged waste for more than six weeks, from January 28th to March 14th (a total of 44 days). 15,523 customers visited a drop-off facility to make use of this service. More than one-third of these customers (5,362) utilised the Council-owned Waitākere Refuse Transfer Station.

Total recorded flood waste is 6,467 tonnes including transfer station drop-offs, skips and flexi-bins, and street collections.

Figure 15 Waste recorded after Jan/Feb 2023 weather events



Early observations into the management of the waste following these events are:

- Flexibility and agility around support method was needed to provide the most suitable response for each affected community.
- Strong inter-organisational links and communications are essential, with support being provided by Civil Defence, New Zealand Defence Force, Task Force Kiwi, Student Volunteer Army and countless volunteers.
- The Resource Recovery Network plays a vital role in disaster situations, with Community Recycling Centres (CRCs) providing resilience and support for isolated communities, receiving and redistributing donated furniture and other essential items, collecting waste from vulnerable households, providing a trusted community connection in addition to receiving waste.

The types and quantity of wastes generated from disasters is, of course, impossible to predict accurately. However, the following natural disaster scenarios – and associated types of waste - are considered applicable to the Auckland region:

- Volcanic eruption (ash, sediment/soil/sand, sludge/mud, rubble/building materials, vehicles/vessels, garden waste/vegetation, general refuse, personal goods, animal waste, chemicals/oil).
- Tsunami/other significant tidal waves (marine debris, sediment/soil/sand, sludge/mud, rubble/building materials, vehicles/vessels, garden waste/vegetation, general refuse, personal goods/whiteware/e-waste, animal waste, chemicals/oil).
- Cyclone/major storm (marine debris, sediment/soil/sand, rubble/building materials, vehicles/vessels, garden waste/vegetation, general refuse, personal goods/whiteware/e-waste, animal waste, asbestos).
- Severe flooding (sediment/soil/sand, sludge/mud, rubble/building materials, vehicles/vessels, garden waste/vegetation, general refuse, personal goods/whiteware/e-waste, animal waste).
- Severe drought (garden waste/vegetation, animal waste).

	Volcanic eruption	Tsunami	Cyclone / major storm	Severe flooding	Severe drought
ash	X				
marine debris		X	X		
sediment/soil/sand	X	X	X	X	
sludge/mud	X	X	X	X	
rubble/ building materials	X	X	X	X	
vehicles/ vessels	X	X	X	X	
garden waste / vegetation	X	X	X	X	X
general refuse	X	X	X	X	
personal goods / whiteware / e-waste	X	X	X	X	
animal waste	X	X	X	X	X
chemicals / oil	X				
asbestos		X	X		

Apart from natural disasters, there are various other scenarios that could generate large quantities of wastes for disposal, including wastes that may be contaminated or hazardous in nature. These are:

- major urban/industrial fire
- offshore vessel damage/shipwreck/oil leak
- large dangerous goods storage/major freighting explosion/chemical release
- major transport accident
- human or animal epidemic/pandemic
- removal of contaminated land to address urgent risks
- planned retreat as a climate change adaptation measure

Following the earthquakes in Christchurch and North Canterbury in the first half of the 2010's three regional councils (Waikato, Bay of Plenty and Environment Canterbury) began collaboration on a Disaster Waste Management Plan, to assist councils and response agencies with an online template and tool flexible enough to take into account unique regional conditions and environments, different types of waste and the various kinds of potential disasters.

Auckland Council came on board as a project partner in 2020 to support the tool's development. The project completed in June 2021, with the tool being hosted by the Waikato Local Authority Shared Services group, however responsibility for ongoing maintenance and support for the tool has not yet been established.[25]

4.8 Key waste streams

Based on the information presented in this section, the following key waste streams have been identified:

- Construction and demolition
    - In 2022 it was estimated that at least one third of all reported tonnes to Class 1 landfills from Auckland are from C&D related activities. This includes a high proportion of timber, which was also responsible for 16 per cent of the landfill emissions.
    - The vast majority of this waste is not under council's management and cannot be addressed through council's existing collection systems processing facilities.
- Soils
    - Soils are one of the single largest waste streams disposed of to landfills with an estimated 2 million tonnes excavated and disposed in 2022. Soils disposed of to a cleanfill cannot be recovered and are lost from beneficial reuse once disposed.
- Food waste
    - In 2022 food scraps comprised 10 per cent of the total tonnes to Class 1 landfill and accounted for 26 per cent of landfill emissions.
    - Council's food scraps collection roll out will reduce the impact of this waste stream, however this is only one aspect of food waste, with food waste occurring higher up the supply chain and on commercial premises/institutions.
- Paper and plastics
    - This includes plastics, paper, cardboard and other single use containers.
    - Together these waste streams contributed 20 per cent of the total tonnes to landfill in 2022, and plastics are a high proportion of litter. Paper contributed 29 per cent of the total landfill emissions. Opportunities beyond recycling, including source reduction, have been noted in previous sections of this waste assessment.
- Nappies and sanitary products including menstrual products
    - The domestic kerbside collections service is one of council's most direct means of impacting the regions waste management. Following the removal of food scraps from

"[25] Disaster Waste Management Plan – Final project report, 2021" prepared by Waikato Regional Council, Bay of Plenty Regional Council, Environment Canterbury and Auckland Council.

the kerbside refuse, this is the next largest component of the kerbside refuse service by weight.

    - Also contributed 3 per cent to total Class 1 landfill emissions in 2022.
    - While there are no options currently for recycling this waste stream, there are initiatives to lift and support whānau to adopt source reduction alternatives. While these are limited, they are not non-existent. Auckland Council already has a cloth nappy programme and promotes alternatives to disposable menstrual products. Subsidies and incentives for reusable alternatives to disposable products could be significantly enhanced as well as subsidising or procuring businesses that offer washing services. Given the environmental benefits from source reduction, there is a role for council in supporting wider social acceptance of alternatives and promoting an economic system to accommodate them. Funding these interventions is considered important given the lack of recycling options available.
    - There are existing policy recommendations in other jurisdictions that could support Auckland Council's advocacy work in this area, for example Zero Waste Europe, and the United Nations Environment Programme.
- Textiles (fashion, uniforms, bedding and towels)
    - While a smaller proportion of the overall tonnes to landfill (5 per cent), textiles contributed 10 per cent to the landfill emissions in 2022.
    - Recycling and recovery options for this waste stream are limited.
- Disaster response and recovery
    - Though not a large contributor to landfill tonnes on an annual basis, experiences with extreme weather events both in Auckland and the Hawkes Bay early in 2023 and with earthquakes elsewhere in the country have shown the necessity to continue planning for this waste stream.
- In-house and operational wastes (Council and CCOs)
    - There is a need for council to show ongoing leadership with management of its own waste, particularly taking steps up the waste hierarchy to model the shift towards a circular economy in Auckland.
    - Includes many of the individual waste streams identified above, as well as biosolids – a waste the council manages that cannot be eliminated or easily reduced given it is a necessary residual produced at Watercare's wastewater treatment plants. There are significant amounts of biosolids produced each year, the majority of which are utilised for rehabilitation of an old quarry site at Puketutu Island. Biosolids represent a high global warming potential impact when disposed to landfill. This future demand issue is discussed further in Chapters 6 and Chapter 8.

The identification of these waste streams as part of the existing waste problem contributes to the identification of the priority waste streams in Chapter 8 of this assessment.

5 Existing services and facilities

This section describes waste management and minimisation services and facilities operating within the Auckland region.

This section does not attempt to catalogue and describe the range of services, tools and infrastructure that exist in the region that support the top two tiers of the waste hierarchy (reduce and reuse). Despite their importance in contributing to the overall waste and resource recovery system in Auckland, there remains a lack of information to adequately describe the range of players and functions. Instead, it is acknowledged here that there are currently numerous services and associated infrastructure in Auckland that help to design-out waste/reduce waste at source across a range of sectors, including construction, manufacturing, product/packaging design, events, and hospitality. Further, there exist a range of services and infrastructure that enable the reuse, repair and redistribution of goods, packaging systems, and surplus food, such as repair shops, repair cafes, second-hand shops (physical and online), online sharing-economy platforms, food rescue enterprises, wash plants and refilleries for reusable packaging systems (both for business to business and business to consumer) and related reverse logistic assets/services. The Sustainable Business Network's Circular Economy Directory provides a source of information that represents some of these waste reduction and reuse services available in the region[26]. As the region progresses through the next WMMP phase, existing source-reduction/waste avoidance and circular systems may become more prominent and expand, creating further methods to better represent their contribution and help identify gaps and opportunities.

The inventory of available waste and resource recovery services and facilities described in this chapter is a combination of those owned, operated or managed by the council, commercial entities, and community groups (or a combination of those). While the best endeavours have been made to make a full and balanced assessment, this inventory is not to be considered exhaustive, particularly with respect to the commercial waste and private diversion industries. This information is considered accurate enough for determining future strategy. Each section concludes with a summary of the services and facilities provided by the council.

Auckland's waste market differs from others in New Zealand in terms of its size, complexity, the geographic scope it serves, and ownership of the infrastructure. Many New Zealand waste markets feature strong local authority involvement in infrastructure ownership, generally with single landfills serving geographically distinct waste catchments. However, the Auckland waste disposal market is largely served by commercial landfills that receive most of the waste from an area from the Far North to Waipa Districts.

The resource recovery market is more fragmented than the waste market, divided according to material types (paper/cardboard, glass, metal, and plastics) rather than by market function (collection, bulking, transfer). A combination of local and international markets is available, creating additional opportunities for local collectors and processors. Auckland's status as the country's largest commercial centre creates additional opportunity to make use of these markets, as does the direct access to shipping routes for the export of materials.

[26] https://sustainable.org.nz/circular-economy-directory/

5.1 Iwi and community engagement and behaviour

5.1.1 Targeted community engagement

Auckland Council collaborates with iwi and local communities to catalyse, connect, enable and support waste reduction and minimisation initiatives. From 2020 to 2023 Waste Solutions Community WasteWise contracts have delivered on a number of community-led programmes, including delivery of targeted initiatives with tailored approaches to provide direct support and education where it is most required. Within this period, some programmes needed to be adjusted during Covid-19 lockdowns to continue to be effective.

Auckland Council provides several services to promote waste reduction, reuse and recycling through key contracts in the areas of:

- **Para Kore Ki Tāmaki (Māori responsiveness)** - Waste minimisation education and support for marae, rangatahi (young people), and organisations through integrating mātauranga Māori and zero waste (para kore) principles and practice. Based on the concept of kaitiakitanga, its success stems from a direct connection to the aspirations of whānau, hapū, iwi, and hapori Māori.
- **Regional / Local Community & Cultural Responsiveness Empowerment and Education Programmes** - Local people catalysing community-led waste minimisation initiatives and preparing their communities for waste service changes.
- **The Compost Collective** - A network of geographically based local and regional composting experts host workshops and provide hands-on assistance in how to compost.
- **Love Food Hate Waste** - Deliver the Love Food Hate Waste campaign, funding food waste prevention action and education across Auckland.
- **Litter Prevention** - Coordinate prevention efforts across council, communities, and other stakeholders to prevent litter. Investigate options to improve enforcement activities.
- **Zero Waste Events** - Providing zero waste event best-practice advice and resources to achieve zero waste for events in Auckland.
- **Waste Free Parenting** - Engaging families and early childhood centres in waste free parenting, encouraging use of reusables rather than disposable products.
- **Developing the Resource Recovery Network** - Provide support and capacity building for emerging operators for Community Recycling Centres. Provide skill sharing and networking events for Auckland's resource recovery community. These facilities help to shape consumer behaviour by increasing sites where reusable and recyclable materials can be taken, repaired/repurposed, and purchased. This waste infrastructure focuses up the waste hierarchy, creating an attitude shift from 'waste' to 'resource'.

In addition, council also supports the delivery of better waste services by piloting new services and informing and preparing communities for waste service changes.

Council services and facilities:

- The community engagement, behaviour change programmes and waste education initiatives outlined in this section are all council-provided services.

5.2 Collection network

5.2.1 Public place waste services

Permanent public place services

Auckland Council Group carries out a range of services related to waste management in public spaces, either directly or in part. Typically, these types of services are jointly managed between the council's waste services arm (Waste Solutions) and other parts of the organisation.

- Litter management – depending on where the litter occurs it may be managed as part of roading services (Auckland Transport), waste services, or parks services (Auckland Council).
- Public litter bins - Within the council these bins are managed by Community Facilities under full facility contracts.
- Public recycling bins – Within council these bins are managed by Community Facilities under full facility contracts. As they are geographically spread out (even more than public litter bins), their cost to operate per tonne of diversion is higher compared to other diversion services council manages. When last audited, these bins were averaging 50 per cent recyclable material, of which approximately 33 per cent was beverage packaging that would be suitable for inclusion in a container return scheme.
- Abandoned vehicle recovery and disposal – generally managed by Auckland Transport, in accordance with the Local Government Act. However, in some areas (e.g. west Auckland) abandoned vehicle services are managed under Waste Services.
- Town centre cleaning – mechanical activities such as street sweeping are managed by Auckland Transport. However, loose litter collection and public bin emptying is managed along with cleaning of public toilets, under Community Facility Services.
- Stream and beach cleaning - could be done by parks, roading, stormwater or community sections within the council. In some cases, other organisations may be involved, such as the Watercare Harbour Clean-up Trust which removes litter from the Waitematā and Manukau Harbours and inner gulf islands and promotes the concept of rubbish-free waterways.
- Enforcement of illegal dumping - the enforcement team uses a combined approach of education, warnings and enforcement (through the issuing of Litter Infringement notices and fines up to $400, together with prosecution for the worst cases) to deter dumpers. Auckland Council cleans up an average of 136 tonnes of illegally dumped items every month, and this costs ratepayers an average of $1.8 million a year to collect. These costs do not include disposal.

Event waste management

Auckland has the population and infrastructure to host major international events like the FIFA Women's World Cup, World Rally Championship, Women's Rugby World Cup and the World Softball World Cup as well as large local annual events around the city. Council and its CCOs are the event organisers for some events, however a large portion are initiated, organised and managed privately.

Zero waste event management is included within Council's overarching Zero waste by 2040 target. Event-specific WMMPs are required for trading, events and filming in council-controlled public places. These plans are designed to help event organisers identify their expected waste streams and how to reduce them.

In 2022 council introduced Event Waste Management Coaching, actively assisting Event Organisers in one-to-one sessions. These sessions have been positive for all parties, developing relationships between Council and event organisers. There is an increased awareness by organisers of the need for and options around delivering waste minimisation at large events, and Council has been able to access better quality information around the quantities and types of waste generated. This is in turn, allows more tailored waste management options to be recommended for future events.

Council services and facilities:

- Public place waste services provided by Council include servicing of litter bins and public place recycling bins, collection of illegally dumped waste and loose litter from road reserves, parks and other open spaces, town centre cleaning, abandoned vehicle recovery and enforcement for illegal dumping.
- Active engagement between Council and event organisers has enabled more effective management of event waste.

5.2.2 Council kerbside collections

Auckland Council plays a major role in the regional domestic waste market. This is due largely to the magnitude of the kerbside residential collection services it provides for refuse, recycling and food scraps. These services are provided to households through contracts managed by the council.

A key action arising from both the 2012 and 2018 WMMPs has been the standardisation of domestic collection services across the Auckland region, including the introduction of food scraps collection services. The diversity of services and funding regimes inherited from legacy councils has made this a complex and lengthy process. Current projects include the roll-out of regionwide food scraps collection services in the 2023 calendar year, which will be followed by implementation of regionwide rates-funding of the refuse collection services from 2025 to 2027, including expanding refuse collections to Rodney, where previously Auckland Council did not offer a service. Following that, all urban households across the Auckland region will receive:

- Weekly food scraps collection service using a 23L bin (green-lidded bin)
- Fortnightly co-mingled recycling collection service using a 120L/240L/360L bin (blue or yellow-lidded bin)
- Weekly refuse collection service using an 80L/120L/140L/240L bin (red-lidded bin)
- All three collection services will be funded through a targeted rate.

The current WMMP signals a move from weekly to fortnightly refuse collection services once the food scraps service is bedded in. Reconfirmation of this change will be considered as part of the review of the WMMP.

Council does not provide green waste collection services. Households can opt into one of the many private green waste collection services available in the region. Council also does not generally provide collection services for businesses as the range of services they require varies significantly. Businesses have a wide range of private collectors they can choose from to provide the bespoke services that meet their needs. However, businesses that have a quasi-domestic need can opt into council's kerbside refuse and recycling services.

There will always be a degree of variation in services across the region to suit the location and housing type. This includes:

- Bespoke services for multi-unit developments (different sizes and frequency of collection depending on site access and bin storage), covered by Council's MUDs servicing policy.
- city centre services – twice daily bag collection (other than Sunday morning)
- Rural services – rural areas currently have the choice of a bag or a bin option which is planned to continue under the rates-funded model. Bags of an equivalent volume to a weekly 120L service will be provided directly to customers choosing this option.
- Services for the Hauraki Gulf Islands – standard roadside services for Waiheke and Great Barrier Islands, consolidation point collection from Rakino Island, and drop-off services only for Kawau Island.

Council services and facilities:

- Kerbside residential collection services for refuse, recycling and food scraps are provided regionwide by Council.

5.2.3 Council inorganic collections

All rateable properties paying a waste charge in Auckland are entitled to receive an annual, pre-booked, on property inorganic collection. The current service diverts inorganic material from landfill by using a two-vehicle collection methodology. A box truck is used to first collect reusable and recyclable materials that are set out for collection, and transports items to one of two storage warehouses (one in the Wairau Valley and the other in Panmure). A compactor truck then follows and collects remaining residual material and transports loads direct to landfill.

Waste Management NZ and Localised Limited hold the current council contracts for the service. Waste Management provides the collection services, and Localised Ltd manages the storage warehouses and distribution services. Localised Ltd has arrangements with over 150 organisations, including numerous charities and community recycling centres, to receive the goods and materials recovered from the inorganic collections.

Residents can put out up to one cubic metre of acceptable items, including appliances, timber, furniture, sports equipment, and electronics. Collections are booked by customers via the council's booking system, according to a regional schedule.

The current service was introduced in 2015, replacing collection services which some legacy councils had provided for many years. The transition from kerbside inorganic collections to a pre-booked, on-property collection was a step towards improving some of the negative impacts associated with kerbside inorganic collections, such as untidy streetscapes, health and safety concerns from people scavenging for materials, and the destruction and disposal of otherwise recoverable items. The preferred long-term option for the service is a model that directly involves the Auckland's Resource Recovery Network community recycling centres. While the development of the RRN is making good progress, it does not yet cover the whole region, and changing the inorganic service model too soon would lead to inequity in accessing a region-wide service.

5.2.4 Private collections

There are approximately 100 (licensed) waste collection operators in the Auckland region, covering refuse, recycling, and organic waste to both domestic and commercial customers. This figure includes multiple entities that may stem from one organisation; for example, different companies created for different types of waste collected, or for joint ventures with the council or other private organisations.

5.2.5 Resource Recovery Network

The Resource Recovery Network (RRN) has been a key initiative in both the 2012 and 2018 WMMPs. It is a large, long-term project that will see the development of Community Recycling Centres (CRCs) across the region, focused on resource recovery. There are currently 13 CRCs, details of which are provided in the table below, of which nine have been developed since the last Waste Assessment in 2017. Some of the newer CRC operators have been successfully contracted using a social procurement process encouraging participation by community groups and not-for-profit organisations. This approach is intended to continue with the development of future RRN sites. A further eight will be developed over the next eight years, with the aim of having 21 CRCs and two resource recovery parks by 2031.

Table 19 Auckland Council Community Recycling Centres (CRCs) – part of the RRN

Name	Operator	Key services/waste streams	Location
Anamata (Aotea / Great Barrier Island) CRC	Envirokiwi Community Enterprise	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, batteries and electronic waste, whiteware and appliances, polystyrene, soft plastics, and used tyres.	66c Gray Road, Aotea / Great Barrier Island
Devonport CRC	Global Action Plan Oceania (GAPO)	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste and alkaline batteries, whiteware and appliances, polystyrene, and soft plastics.	27 Lake Road, Devonport
Helensville CRC	Helensville Enterprises Trust	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste and alkaline batteries, whiteware and appliances, polystyrene, and soft plastics.	35 Mill Road, Helensville
Lawrie Road CRC	Mahurangi Wastebusters Limited	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste and alkaline batteries, whiteware and appliances, polystyrene, and soft plastics.	55 Lawrie Rd, Warkworth
Manurewa CRC	Beautification Trust	Accepted materials include saleable household items including furniture and clothing, clean recycling, and soft plastics.	38 Holmes Road, Manurewa

Name	Operator	Key services/waste streams	Location
Onehunga CRC	Onehunga Zero Waste Limited	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste and alkaline batteries, whiteware and appliances, polystyrene, and soft plastics.	37 Victoria Street, Onehunga
Rustybrook C&D	Mahurangi Wastebusters Limited	Closed to the public as site and services are refined.	141 Rustybrook Rd, Wellsford
Tāmaki CRC	Localised Ltd	Accepted materials include saleable household items including furniture and clothing, clean recycling, general waste, timber/wood, electronic waste, whiteware and appliances, polystyrene, and used tyres.	153 Pilkington Road, Point England
Waiheke Community Resource Recovery Park, including Waiheke Recovery Shop	Island Waste Collective	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste and batteries, whiteware and appliances, polystyrene, soft plastics, and used tyres.	108-110 Ostend Road and 4-6 Tahi Road, Waiheke Island
Waiōrea CRC	MPHS Community Trust	Accepted materials include saleable household items including furniture and clothing, clean recycling, alkaline batteries and electronic waste, small and medium appliances, and polystyrene.	990 Great North Road, Western Springs
Waitākere CRC	MPHS Community Trust	Accepted materials include saleable household items, including furniture and clothing, electronics, and household hazardous waste.	50 The Concourse, Henderson
Wairau CRC	Localised Ltd	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, electronic waste, whiteware and appliances, polystyrene, soft plastics, and used tyres.	9 Porana Road, Wairau Valley
Waiuku CRC	Waiuku Zero Waste Limited	Accepted materials include saleable household items including furniture and clothing, clean recycling, scrap metal, general waste, garden waste, building materials including timber/wood, limited hazardous waste, electronic waste, whiteware and appliances, polystyrene, soft plastics, and used tyres.	5 Hosking Place, Waiuku
Whangaparāoa CRC	Hibiscus Coast Zero Waste	Accepted materials include clean recycling, scrap metal, electronic waste and small appliances, polystyrene, and soft plastics.	637 Whangaparāoa Road, Stanmore Bay

Council services and facilities:

- Council provides 13 Community Recycling Centres across the Auckland Resource Recovery Network, with a further eight due to be developed by 2030.

5.2.6 Refuse Transfer Stations (RTS)

The Auckland waste collection and disposal market is reliant on a network of transfer stations, most of which are privately owned. The difference between the facilities in the RRN and the network of transfer stations is scale of material handled. The RRN handles car, trailer and small skip loads of both waste and recoverable materials from residents and small commercial collectors. The transfer stations handle bulk refuse from collection services, both private and council collections. Generally, the transfer stations also have drop-off facilities for recyclable and recoverable material, but these are not the main focus of these facilities. Table 20 below summarises the transfer station facilities in the Auckland region that are open to the public. Figure 16 illustrates the locations of refuse transfer stations and landfills, the core facilities that service the Auckland region.

Auckland Council owns the Waitākere RTS and transfer facilities on Waiheke and Aotea Islands, is a part owner of the East Tamaki RTS via the Waste Disposal Services joint venture, while the 11 remaining RTS are privately owned. All of the commercial transfer station operators also own landfills. For those operators with landfills located outside the Auckland region, the transfer stations are used to consolidate refuse prior to bulk haulage to their own landfills.

Table 20 Summary of transfer stations in the Auckland region (open to the public)

Name	Owner	Waste stream	Location
Constellation Drive Refuse Transfer Station	EnviroNZ	General waste, recyclables, and garden waste	Mairangi Bay
Drury South Transfer Station	Green Gorilla	Commercial and public drop off General, household and construction waste	Drury South
East Tamaki Transfer Station	Waste Disposal Services (Auckland Council and Waste Management)	General waste, recyclables, and garden waste	East Tamaki
North Shore Refuse Transfer Station	Waste Management	General waste (bulk), commercial green waste	Rosedale
Onehunga and Takanini Transfer Stations	Kiwi Waste and Recycling	General waste	Onehunga Takanini
Selwood Road Refuse Transfer Station	Waste Management	General waste, recyclables, and garden waste	Henderson
Papakura Transfer Station	Waste Management	General waste, recyclables, and garden waste	Takanini
Pikes Point Transfer Station	EnviroNZ and Waste Management	General waste, recyclables, and garden waste	Onehunga
Patiki Road Refuse and Recycling Transfer Station	EnviroNZ	General waste and recyclables	Avondale

Name	Owner	Waste stream	Location
Pukekohe Refuse and Recycling Transfer Station	EnviroNZ	General waste, recyclables, and garden waste	Pukekohe
Silverdale Transfer Station	Northland Waste t/a Econowaste	General waste, recyclables, and garden waste	Silverdale
Waitākere Refuse and Recycling Station	Auckland Council	General waste, recyclables, and garden waste	Henderson
Wiri Transfer Station	EnviroNZ and JJ Richards	General waste, recyclables, and garden waste	Wiri

Council services and facilities:

- Council owns and operates the Waitākere Transfer Station, and waste transfer facilities on Aotea and Waiheke Islands, and is a part owner of the East Tamaki Transfer Station.

5.2.7 Hazardous waste collection

The hazardous waste market comprises both liquid and solid wastes that, in general, require further treatment before conventional disposal methods can be used.

A range of treatment processes are used before hazardous wastes can be safely disposed. Most disposal is either to landfill or through the trade waste system. Some of these treatments result in trans-media effects, with liquid wastes being disposed of as solids after treatment. A very small proportion of hazardous wastes are intractable and need exporting for treatment. These include polychlorinated biphenyl, pesticides, and persistent organic pollutants.

The number of participants in this market is relatively small. Chemwaste Industries operates as a division of EnviroNZ's Technical Services subsidiary, and Waste Management Technical Services and Nuplex Medismart are owned by Waste Management. Interwaste operates the steam sterilisation unit at Auckland International Airport, treating much of the region's quarantine and medical sharps waste.

Hazardous wastes that meet specified criteria are accepted at the following locations (mix of council and privately-owned):

- Anamata (Aotea Great Barrier Island) Community Recycling Centre
- Silverdale Refuse Station
- Waiheke Island Community Recycling Centre
- Waitākere Refuse and Recycling Transfer Station.

Auckland Council funds the receipt and recycling/disposal of hazardous wastes for these facilities. All four sites accept the following potentially hazardous wastes:

- household chemicals (including garden chemicals)
- persistent organic pollutants (POPs)
- old chemicals (30+ years), of any variety and in a degraded and potentially dangerous state
- polychlorinated biphenyl (PCBs)
- special paint products (lead based, marine anti-fouling paint, bitumous products)
- solvents
- potentially explosive or dangerous chemicals
- mercury and mercury containing items (excluding lamps)
- flares and other explosive materials/devices.

Waste Management Technical Services in East Tamaki also offer small load asbestos disposal services to the general public.

In addition, the Waitākere Refuse and Recycling Transfer Station accepts vehicle batteries, with Altham Batteries, Interwaste and GoCycle providing alternative private collection and recycling services.

A drop-off service for 9kg BBQ gas bottles is limited to the Waiheke Island Recycling Centre and the Waitākere Refuse and Recycling Transfer Station.

Gaining resource consent for the acceptance of hazardous wastes at more CRC locations continues to be a challenge, resulting in limited options for the drop-off of hazardous waste being open to the public, however it is expected that Waiuku CRC will come online for drop off in 2023.

Council services and facilities:

- Limited hazardous waste drop-off at transfer stations and community recycling centres.

5.3 Processing facilities

5.3.1 Organic waste processing

Although organic waste continues to make up a significant proportion of Auckland's waste to landfill, it is estimated that around 190,000 tonnes of garden and food wastes is diverted from landfill annually (Table 12). Table 21 summarises the organic waste processing facilities and service providers.

The processing of Auckland's green waste is well developed and serviced by established composting facilities operated by Living Earth Ltd, Envirofert and EnviroNZ. A smaller composting facility owned by GreenCycle has recently become established in Auckland and processes difficult-to-compost garden waste such as logs, flax, palms, weeds, bamboo. Rendering of pre-consumer meat and seafood waste has been well established for many years. Most of the waste is sourced from pre-consumer activity such as animal processing operations and supermarkets. The collection of pre-consumer food waste for use as stock feed is also well-established and understood to have further potential for growth. Some large generators of green waste - such as arborists - process wood waste on-site and use it immediately as mulch.

Facilities that can process post-consumer food wastes have increased since the 2017 waste assessment, with the EnviroNZ facility at Hampton Downs and Ecogas facility at Reporoa now servicing the Auckland region. Another area of expansion since 2017 is the establishment of food rescue organisations that partner

with community service organisations to use food near end of life to feed those in need. Some of the larger organisations supporting and coordinating work in this area include:

- Salvation Army
- Auckland City Mission
- Kiwi Harvest
- Fair Food
- Love Soup
- South Kaipara Good Food
- NZ Food Network

Currently biosolids from Watercare's Mangere wastewater treatment plant are used beneficially to rehabilitate the Puketutu Island quarry site close to the Mangere wastewater treatment plant. However, beyond 2033, a new solution will be needed for the significant quantities of biosolids generated. Watercare is actively looking to work with the council, iwi and communities to investigate solutions to optimise resource recovery from its biosolids, including technology to reduce volumes created and options to review the regulatory framework to enable biosolids (along with excavation material) to be returned to land.

Council services and facilities:

- Council does not own or operate organics processing facilities.

Table 21 Organics processing facilities in the Auckland region/servicing the Auckland region

Name/owner	Key services/waste streams	Location
Living Earth Ltd	Composts garden waste	Puketutu Island
Envirofert Ltd	Processes organic waste through vermicomposting and windrow composting	Tuakau
Eco Stock Supplies Ltd	Collects and processes pre-consumer food waste into animal feed stock	Wiri
Ecogas Ltd	Consolidation of pre- and post- consumer food waste at Papakura, for processing at the anaerobic digester in Reporoa	Papakura and Reporoa
EnviroNZ Ltd	Composting of food and garden waste	Hampton Downs, Waikato
Green Cycle	Composting of green waste, includes solutions for materials not usually handled by compost facilities such as palm, bamboo, flax and logs	Penrose
Heards Landscape Supplies	Organic wastes, including green waste and demolition timber	Papakura
PVL Proteins Ltd	Fish and meat processing waste into fertiliser and tallow products, integrated with meat processing facility	Penrose
Tuakau Proteins Ltd	Fish and meat processing waste into fertiliser and tallow products, high protein supermarket food wastes	Tuakau
Wallace Corporation	Rendering products, protein products and tallows.	Waitoa

5.3.2 Recyclables processing and end markets

Reprocessing markets for recyclable materials exist both locally and internationally, but vary by material type, and are subject to global factors and fluctuations in material values. Auckland's status as the country's largest commercial centre also creates opportunity to make use of available end-markets, as does the direct access to shipping routes for the export of specific materials with commodity value (e.g. metals, paper, plastics).

Auckland's reliance on overseas markets for specific recyclable materials (e.g. plastics, metals, paper) has become a significant challenge since 2018, when China implemented new policies essentially banning the import of recyclable materials to their markets.

Kerbside collection service providers (councils and private operators) and MRF operators independently source and secure their own market arrangements for the materials collected and sorted within each region. For this reason, councils and commercial recyclers can be competitive with one another, and protective of arrangements for on-shore or offshore end-markets.

Sorted recyclables processed through Council's Onehunga MRF and other private recyclables sorting facilities are sold to both onshore and international re-processors.

Table 22 lists facilities available for the sorting and processing of dry recyclables and the local end markets they use. Organics, construction and demolition waste and other recoverable materials are covered in other sections. The list may not include all Auckland-based facilities, and it excludes facilities outside the Auckland region and overseas that processors within the region rely on as part of their services.

Some of the consolidation services for recyclables or the processing facilities in the Auckland region have been in service for many years, including scrap metal dealers, the Visy glass furnace and the Oji paper mill. More recently, plastics reprocessing infrastructure has developed in Auckland, including Astron Sustainability in East Tāmaki, owned by Pact Group which is the largest local plastics re-processor in NZ.

Commodity prices have been highly volatile in recent years[27]. Sorting facilities have been focused on producing high-quality single-stream bales, with low contamination levels, so that they can be guaranteed to be sold on international markets. Some onshore processing has been established in recent years but this has tended to be for low-value or niche materials for which small-scale processing facilities are cost-effective to develop in New Zealand.

Council services and facilities:

- Council owns the Onehunga MRF (ownership transfers 1 July 2024 from Visy Recycling), with operations contracted out.

[27] www.letsrecycle.com

Table 22 Recyclables processing facilities in the Auckland region

Name/owner	Key services/waste streams	Location
Auckland Council, Onehunga MRF (currently owned and operated by Visy Recycling under contract with Auckland Council. Operated under contract by Re.Group from July 2024).	Sorts and separates dry recyclables from the council's kerbside collections, and on-sells sorted materials. Also accepts mixed dry recyclables at the gate	Onehunga
Future Post	Processes soft plastics/HDPE milk bottles into fencing posts.	Waiuku
Green Gorilla	Processes dry recyclables from their private commercial and residential collections, reprocessing of paper waste	Onehunga
Junk Run	Hand sorts and separates waste on site to redirect to reuse and recycling	Kingsland
Oji Fibre	Recycles paper and cardboard at Penrose plant	Penrose
Pact Group (also t/a Astron Plastics)	Processes pre-consumer and post-consumer plastic waste	East Tamaki and Albany
Reclaim	Collect, consolidate and on-sell paper, cardboard and other commodities (plastics, steel, aluminium, and glass)	Penrose
Rubbish Direct	Processes dry recyclables from their private commercial and residential collections, reprocessing of paper waste	Glendene
Visy (NZ) Ltd	Owner/operator of the Penrose glass furnace where recovered beverage glass is recycled. Also owns glass beneficiation plant Export recyclables to their own reprocessing facilities for plastics and fibre in Australia Owner/operator of the Onehunga MRF until June 2024. Owner/operator of glass beneficiation plant in Onehunga	Penrose
Waste Management	Processes dry recyclables from their private commercial and residential collections, reprocessing of paper waste	Penrose
Various metal recyclers	Collect and export scrap steel	Throughout Auckland

5.3.3 Construction and demolition waste recovery facilities

While most of the recovered materials market is structured around individual commodities, the construction and demolition recovery market differs in that it is based around collecting and processing a wide range of wastes from a single industry. This creates diversity in both the processing requirements and the potential opportunities and markets for reuse. Some materials contained within C&D wastes are transferred to other parts of the waste sector, for example, scrap metal (rebar) removed from waste concrete.

Due to the nature of C&D waste (bulky, heavy materials) the strength of local markets is perhaps more important than for other types of recovered materials that are more readily consolidated for export.

Auckland's C&D waste processors are continuing to respond to the range of opportunities available to divert C&D wastes, working with potential end users to secure markets as well as working with waste producers to secure supply.

As part of the Waste Assessment, Council has compiled an extensive database of C&D waste sector providers to support engagement with the sector. The list is not reproduced here due to its size but includes over 120 providers of alternative destinations for C&D waste, covering approximately 40 different waste streams. There is a need for a centralised platform to facilitate information sharing and industry engagement, that is properly resourced to keep the list up to date and freely available for industry, supporting measures to introduce mandatory site waste plans.

Council services and facilities:

- Council does not own or operate C&D waste processing facilities.
- Council accepts limited materials through some CRC sites
- Most C&D waste streams are dependent on private processing facilities.

5.3.4 Other recovery facilities and services

Recovery facilities and related services for other materials are beginning to be developed in the Auckland region. These currently include facilities for end-of-life tyre processing, e-waste recyclers, textile recyclers, redistribution of redundant corporate furniture and appliances, and recycling of non-packaging plastics. These facilities and services are listed in Table 23 but is not an exhaustive list.

E-waste is managed by a number of smaller organisations, with a range of reuse and recycling options for e-waste and its fractions, including local reuse via repurposing of disposed of machines to schools through to offshore transport for recycling purposes.

Council services and facilities:

- Council does not own or operate other waste processing facilities.

Table 23 Recovery facilities for other materials supporting the Auckland region

Name/owner	Key services/waste streams	Location
Abilities	Secure document destruction, e-waste recycling, and packaging waste management	Glenfield
All Heart	Partners with corporates to redirect and repurpose redundant items.	Albany, Manukau
Computer Recycling	E-waste recycling and reuse	Penrose
Phoenix Metalman	E-waste, battery recycling	Penrose
Upcycle	E-waste/batteries recycling	Onehunga
JJ Laughton	Tyre shredding	Glendene
Golden Bay Cement	Energy recovery from tyres	Marsden Point, Whangarei
Waste Management	Recycling of end-of-life tyres	Wiri
5R	Flat glass, window glass recycling	Auckland
Interwaste	Hazardous waste treatment and recycling (fluorescent tubes, dental amalgam, precious metals, quarantine, medical, pharmaceutical, secure waste, batteries and IT equipment)	Auckland Airport
Upparel	Textile recovery and recycling	Onehunga
IP Plastics-Polymer Processing	Recovery and reprocessing of durable polypropylene plastic (#5) products (eg. buckets, chairs)	Papakura
Aliaxis-Marley & Waste Management JV	PVC/HDPE pipe recycling	Penrose and Manurewa
Expol	Polystyrene recycling	Penrose

5.4 Disposal facilities

5.4.1 Class 2-5 landfills and industrial monofills

In 2020, a classification system for different types of landfill facilities was developed by WasteMINZ through the publishing of their Technical Guidelines for the Disposal of Waste to Land. The classification system was adopted by the Ministry for the Environment and used to define which sites would be included in the government's recent changes to the Waste Disposal Levy regime. The landfill classifications and their levies are shown in the following table. Between 2009 and 2020, only Class 1 landfills were required under government regulations to pay the Waste Disposal Levy which was set at $10/tonne. Since then, the levy has increased and expanded to other classes of landfills.

Table 24 Landfill classification and levy

LANDFILL CLASS	Waste types	Waste Disposal Levy, 1 JULY 2024
Municipal landfill (class 1)	Mixed municipal wastes from residential, commercial and industrial sources	$60/tonne
Construction and demolition fill (class 2)	Accepts solid waste from construction and demolition activities, including rubble, plasterboard, timber, and other materials	$30/tonne
Managed or controlled fill facility (class 3 and 4)	One or more of: • contaminated but non-hazardous soils and other inert materials (eg, rubble) • soils and other inert materials	$10/tonne
Cleanfill (class 5)	Virgin excavated natural materials such as clay, soil and rock.	No levy, reporting only
Industrial monofills	Accepts disposal waste that: • discharges or could discharge contaminants or emissions • is generated from a single industrial process (e.g., steel or aluminium-making, or pulp and paper-making) carried out in one or more locations.	No levy, reporting only

Depositing materials that comply with the definition of 'cleanfill' on land is generally a permitted activity within the region but requires a resource consent above a given volume. 'Managed fill' sites that commonly accept industrial process wastes or soil with low levels of contamination are more rigorously controlled through the resource consent process. Monofills have similar controls to managed fills, but accept only one type of material, such as biosolids from wastewater processing.

Auckland Council's current data shows 12 consented Class 3 and 4 managed fills and 28 consented Class 5 cleanfills and two monofills across the region. There are no Class 2 (C&D) landfills in the Auckland region. It is likely that if a Class 2 landfill resource consent application was received, it would be consented under Auckland Unitary Plan rules as a Class 1 sanitary landfill due to the environmental impacts of Class 2 landfills (leachate, gas) that need to be managed being similar to Class 1. There are other fill sites in the region that are not consented, however, the current regulatory environment does not provide for the number of these sites, and fill quantities they accept, to be tracked.

Analysis by Pattle Delamore Partners conducted for this report estimates that approximately 2.09 million tonnes of managed and cleanfill material is disposed of annually to the consented Class 3-5 landfills in the region and Class 2-5 landfills outside the region (Appendix E).

Ownership of Class 3-5 landfills is much more fragmented than Class 1 landfills, with quarry owners, transport operators and private developers involved in developing and managing these sites, alongside the Class 1 landfill operators who operate Class 3-5 landfills as well.

A substantial proportion of the material disposed at Class 2 facilities outside the region is generated by construction and demolition activity and could be diverted from landfill entirely. This is one of the reasons the waste levy is higher for Class 2 landfills than Class 3 and 4 landfills.

The registering of Class 2-4 landfills and industrial monofills as part of the waste levy system is likely to result in a significant improvement in the level of data available in relation to these disposal sites. From which, better future planning of alternatives to disposal can be developed. Applying the levy to Class 2-4 facilities also removes the temptation to classify contaminated soil as clean to avoid the high disposal costs at Class 1 landfills (that attract both the waste levy and ETS costs).

Watercare and NZ Steel are the main operators of monofills in the Auckland region, accepting residues from the digestion of sewage sludge (biosolids) and steel production respectively.

5.4.2 Class 1 Landfills

There are currently four operational Class 1 landfills (as defined by Waste Management Act 2008) serving the Auckland region. If managed effectively, the combined capacity of these landfills provides sufficient capacity to service Auckland's waste disposal needs for several decades to come. The Class 1 landfills are:

- Redvale Landfill, owned by Waste Management, and is currently consented to receive waste until 2028.
- Whitford Landfill, owned by Waste Disposal Services, a 50-50 joint venture between Auckland Council and Waste Management. The landfill is consented to receive waste until 2041.
- Hampton Downs Landfill, owned by EnviroNZ, and is currently consented to receive waste until 2036. It is expected that applications for new consents for this landfill will be submitted in advance of the consent expiry date.
- Puwera Landfill, owned by Northland Waste and Whangarei District Council (via a 50:50 joint venture), and currently consented to receive waste until 2038.

Waste Management have sought consents for a new landfill to replace Redvale, north of Auckland, in the Wayby Valley. Claris Landfill, located on Great Barrier Island and owned by Auckland Council, is consented to accept waste up to 2027 but it is now mainly used as a transfer station, septic waste disposal and for emergency waste disposal purposes. Waste from the island is now transported to the mainland for disposal. Planning and design activities for the closure of Claris Landfill are underway.

Council services and facilities:

- Of the four major Class 1 landfill facilities, the only council involvement is via the joint venture with Waste Management in Waste Disposal Services, which owns and operates Whitford Landfill and the East Tamaki Transfer Station.
- No council-owned Class 2 to 5 operating landfills, except the Watercare monofill operation at Puketutu.

5.4.3 Closed landfills and contaminated land

There are approximately 200 Auckland Council managed closed landfills across the region. Most of these sites are on council land and comprise a broad range of fill types from regulated legacy municipal landfills, balefills, council depot waste pits to informal dumps along esplanade reserves.

Most sites now have other activities occurring on their surface, generally parks and reserves, although some closed landfill sites have residential and commercial dwellings on or adjacent to them. Other sites have established council-controlled waste/resource recovery activities operating on them (e.g. Onehunga

Materials Recovery Facility, or the Waitākere Resource Recovery and Transfer Station or some Community Recycling Centres).

Aftercare management of these sites is undertaken by Auckland Council's Closed Landfills Team, working closely with other council teams which manage the use of the land.

Closed landfills can pose ongoing environmental, economic, social, and cultural risks and represent a liability for future generations to manage. It is recognised that legacy landfills represent a significant cultural loss for mana whenua given the historic degradation (and ongoing impacts) that past waste disposal practices have had on areas that local iwi/hapū hold strong rights and connections to. As such the Closed Landfills Team has made a deliberate effort to engage with iwi not only in site-specific projects but also in developing the Closed Landfill Asset Management Plan.

Closed landfill hazards include but are not limited to contaminant discharges, landfill gas (nuisance odour, as well as explosive/flammable and/or greenhouse gas emission risks), stability and subsidence. In addition, the majority of council closed landfills are located next to or in the vicinity of the coast and waterways. These sites are vulnerable to the effects of rising sea levels and increased frequency of storm events, due to climate change or natural hazards. Programmes, processes and procedures are in place for environmental monitoring, site investigations and asset management to ensure risk posed by these hazards are at an acceptable level.

Some closed landfills have dedicated gas collection and venting systems based on the level of risk, and one (Rosedale Tip Site) operates flares to burn off landfill gas. There is only one closed or closing landfill that currently converts landfill gas to energy (Greenmount). This has been privately owned and managed to date, although this may shift to become council's responsibility from 2024 onwards and may no longer operate generators when this shift occurs.

Aside from closed landfills, other council-owned land may be contaminated from past activities such as industrial, mining or agricultural uses that discharged hazardous substances to the land. This land is the responsibility of Auckland Council, whereas other contaminated land in the region (including closed landfills on private land) remains the responsibility of landowners. Management and activities on all contaminated land (council or private) is required to comply with council's RMA/NBEA regulatory framework.

Auckland Council acknowledges actions identified in the National Adaptation Plan. The Closed Landfill Team is currently undertaking a climate vulnerability assessment of council's closed landfills in line with the the MfE developed assessment tool which has been piloted in other regions. The findings of this assessment will be incorporated into investigation, physical works planning and existing aftercare activities where appropriate.

Council services and facilities:

- Aftercare management, maintenance and renewals of closed landfill sites.
- Management and activities on contaminated land (council or private) is required to comply with council's RMA/NBEA regulatory framework.

5.4.4 Recovery of energy from waste

Waste to energy (or energy from waste) is a broad term used to describe processes that treat waste materials to generate heat, fuel, gas, chemicals, and/or electricity. Processes include co-processing, incineration, pyrolysis, gasification, anaerobic digestion and landfill gas capture.

The recovery of energy from waste continues to be a divisive, debated topic. Those in favour of Waste to Energy (WtE) refer to its benefits relative to landfill disposal and as a means to decarbonise the energy sector (e.g as a replacement for coal in boilers). Those against it refer to its shortcoming compared to waste prevention and other waste minimisation measures further up the waste hierarchy. Further discussion about the types of WtE processes and their role in managing and minimising wastes in Tāmaki Makaurau is provided in Appendix C.

There are already WtE facilities utilised as part of Auckland's waste management and minimisation system. Without these, the residual value of these resources as an energy source would be lost, due to the need for bulk handling solutions or a lack of alternatives. These include:

- Anaerobic digestors for wastewater sludges at Watercare's wastewater treatment plants
  - Enables energy recovery to produce biosolids prior to disposal, reducing greenhouse gas emissions
- Ecogas's anaerobic digestor used for the management of bulk food wastes, including Auckland's kerbside-collected food scraps
  - Enables recovery of a range of resources from bulk food wastes including heat, bioenergy, carbon dioxide and nutrients
- Use of treated timber and end-of-life tyres at Golden Bay Cement kiln in Whangarei, and waste-oil utilisation at consented industrial operations
  - Enables energy recovery from materials that are otherwise difficult to recycle, particularly at scale
- Landfill gas-to-energy plants at all operational Class 1 landfills in Auckland and at a Greenmount closed landfill site (EnviroNZ)
  - Enables energy recovery from landfill gas that would otherwise be lost as heat when captured gas is flared

Council services and facilities:

- Council's CCO Watercare operates anaerobic digesters at its wastewater treatment plants.
- Council uses the Ecogas anaerobic digestor for processing of its kerbside-collected food scraps, and the Golden Bay Cement kiln for energy recovery from tyres and treated timber collected via its transfer station and resource recovery centre network.
- The Whitford landfill, for which Council has a 50 per cent ownership share, has a gas-to-energy plant.

5.5 Summary of key facilities

The below map shows a summary of the known RTS and CRC sites, and processing and disposal facilities discussed in the previous sections. The map includes all Council facilities and private facilities where they are open to the general public, however the map does attempt to include all collection and processing points for single waste streams.

Figure 16 Key waste facilities for the Auckland region

5.6 Product stewardship schemes

Auckland Council has advocated strongly for a shift towards greater regulation and the use of economic incentives to reduce material consumption at source. Product stewardship is just one tool that would enable these sorts of economy-wide changes to occur.

Under the WMA, if the Minister declares a product a “priority product” under s 9 of the Act, then a product stewardship scheme for that product must be designed and accreditation obtained. After which, participation in the scheme can be made mandatory by regulation under s 22 of the WMA. In 2020, the Minister declared six priority products: plastic packaging, tyres, electrical and electronic products (including large batteries), agrichemicals and their containers, refrigerants and other synthetic greenhouse gases, and

farm plastics. Schemes for these products are all at different stages of the process leading up to accreditation and regulation, with some in the early stages of design (e.g. plastic packaging) and some fully designed and accredited and with regulation coming into effect in 2024 (e.g. tyres).

Ideally the government will consider other economic instruments too, such as consumer protections and guarantees, eco-modulation taxes/fees, and binding material reduction targets or target setting powers.

In relation to products that have not been declared a priority, product stewardship schemes may still be designed voluntarily, and the scheme managers can apply for the scheme's accreditation with the government. However, it is not possible under the current law, to make participation mandatory in a scheme designed for a non-priority product.

A summary of the current product stewardship schemes that have either been accredited or regulated by the government under the WMA is outlined in . Over time more product stewardship schemes are expected to be added to this list and some of the existing accredited schemes are moving towards becoming regulated schemes. None of the schemes listed below in Table 25a are regulated yet however the Tyre Product Stewardship Scheme will be regulated in March 2024. It is important to note that the development and accreditation of voluntary and priority product PS schemes is an active, living process. For this reason the table below may become quickly outdated. The most up-to-date information on the status of schemes can be found on the Ministry for the Environment website. This is also where more information can be found on accredited non-priority product stewardship schemes.

Table 25a priority product schemes.

Scheme/Priority Product Name	Regulated	Details
Agrichemicals and their containers, plastic sileage	Agrecovery Foundation has been operating an accredited scheme for agrichemicals and their containers, prior to the latter being declared a priority product. AgRecovery is leading the co-design process for agrichemicals and their containers, as well as farm plastics (which can be recovered via a separate existing accredited scheme known as Plasback), following priority product declarations. The scheme is now working towards proposed regulations.	Agrecovery provides NZ farmers and growers with programmes for container recycling, drum recovery and collection of unwanted and/or expired chemicals. Plasback provides systems for return of silage plastic wrap and other farm plastics.
Large batteries	Declared a priority product. Scheme co-design led by the Battery Industry Group (now governed by Auto Stewardship New Zealand, a not-for-profit Product Stewardship Organisation). Scheme currently in late stage of design phase prior to accreditation and then regulation (proposed regulations consulted on in 2021)	Managed by the Battery Industry Group, covering batteries greater than 5kg, excluding lead-acid batteries.
Plastic packaging	Declared a priority product. Currently in co-design phase, led by The Packaging Forum and the Food and Grocery Council.	The Packaging Forum and New Zealand Food and Grocery Council are leading the two-year co-design process on plastic packaging.
Refrigerants and other synthetic greenhouse gas	Accredited scheme prior to refrigerants being declared a priority product. The Scheme Manager (Cool-Safe) have led the co-design process for refrigerants and other synthetic greenhouse gases	The Trust for the Destruction of Synthetic Refrigerants, which operates as Cool-Safe (previously as RECOVERY Trust) collects and responsibly disposes of refrigerants

Scheme/Priority Product Name	Regulated	Details
recovery scheme	Cool-Safe has applied for accreditation, and scheme is awaiting implementation of regulations (regulations consulted on in 2022)	used in the refrigeration and air conditioning industries.
Electrical and Electronic Products	Declared a priority product. Scheme co-design led by TechCollect, who published recommendations for the scheme in June 2023. Government plans to consult on regulations in 2024.	End of life e-waste scheme.
Tyrewise	Accredited scheme for tyres (governed by Auto Stewardship New Zealand as the Product Stewardship Organisation), which are a priority product. Scheme designed and awaiting implementation of regulations (regulations consulted on in 2021)	New Zealand's first regulated product stewardship scheme covering the management of tyres (regulations will come into force in March 2024).

Table 25b accredited non-priority product schemes.

Scheme and/or Priority Product Name	Accredited, non-priority product groups	Details
Envirocon	Accredited scheme for non-priority product, non-regulated	Waste concrete (including potentially harmful liquids) is diverted from landfill and upcycled into value-added precast concrete products for the Interbloc Modular Wall System.
Filter disposal services	Accredited scheme for non-priority product, non-regulated	Take back scheme for used oil filters from vehicles.
Glass Packaging Forum	Accredited scheme for non-priority product, non-regulated	The forum connects businesses that sell glass-packaged consumer goods with those that collect and recycle glass. This helps to improve the quality and quantity of glass recycled. The aim is zero container glass to landfill.
Interface ReEntry Programme	Accredited scheme for non-priority product, non-regulated	The scheme recycles used Interface carpet tiles into new carpet tiles and other products. PVC backed carpet tiles beyond their usable life are sent back to the original manufacturer in the US where they are stripped and remanufactured.
Resene Paintwise	Accredited scheme for non-priority product, non-regulated	Take-back of paint and paint receptacles. User pays for non-Resene branded paint and paint receptacles.
Recovery Oil Saves the Environment (ROSE)	Accredited scheme for non-priority product, non-regulated	The used-oil recovery programme enables users, oil producers and regulators to responsibly collect, transport, use and dispose of used oil.
Sharp Comprehensive Recycling and Waste Reduction Scheme	Accredited scheme for non-priority product, non-regulated	Sharp New Zealand aims to reuse and recycle 100 per cent of its packaging materials, electronic products, equipment and obsolete and used parts.

Case Study 1: Oversized Rigid Polypropylene (PP) Recycling Initiative

Initiative set-up

In 2022, Auckland Council began supporting IP Plastics, a local Papakura-based plastics manufacturer, to establish circular end-of-life pathways for oversized household PP plastic items. Amber Maisey, (Chief Operations Officer at the Maisey Group, and previous IP Plastics General Manager,) wanted to do something about the considerable volumes of their own valuable polypropylene going to landfill.

IP Plastics produce items such as storage bins, buckets, laundry baskets, their iconic blue clamshell paddling pools (which are made from around 2.5kg of virgin PP each).

They engaged with Nikki Withington, consultant at Square One (SQ1) to bring stakeholders together and facilitate the recovery of their (and other manufacturers/importers') used PP products, for reprocessing into new recycled content PP (rPP) products. The project was co-funded through Plastics NZ's Circular Connect programme and supported in kind by Auckland Council.

Council was able to use its Resource Recovery Network to support a take back trial and gain publicity for the initiative through its marketing team, to provide a place for Aucklanders to bring back their unwanted rigid PP items for recovery.

IP Plastics and their recycling partner Polymer Processing were then able to collect the items to bring back to their hub to be shredded, re-pelletised and then the pellets were sent next door to IP Plastics for injection-moulding into new rPP products.

Challenges

IP Plastics were already using their in-house post-industrial clean scrap, but there was not enough of this to create new recycled content product lines, as strongly demanded by customers. They wanted to avoid having to import rPP from overseas, as it made more sense to source it locally, if they could resolve the logistical and cost issues associated with recovery. However, it is cheaper to use imported virgin or imported recycled resins.

Because it has been solely driven by one producer and the Circular Connect funding has ended, it has become unsustainable for IP Plastics to continue running the initiative alone. Logistics has been the single largest cost, and despite trialling different transportation options, they have not been able to offset these costs yet.

Opportunities

This project was essentially a pilot trial to establish oversized household PP collections and is now ready to use as a model for scaling further throughout the wider Auckland region and throughout the rest of the country. It has significant potential to be a game-changer for household plastics that are too large to be recovered through the kerbside system. The initiative now needs adequate investment from other manufacturers/producers and Government to build infrastructure so there is more usable material for a wider range of recovery operators, reprocessors and manufacturers to utilise. It would also reduce New Zealand's reliance on imported virgin and recycled resins.

It would require contributions from other businesses to apply for the likes of local territory funds and/or Plastics Innovation Funding, (as the current signals of the Waste Minimisation Fund are not applicable to this project.)

This initiative has demonstrated the need for a Product Stewardship or Extended Producer Responsibility scheme for plastics beyond just packaging and farm plastics as a way of ensuring sufficient funding is provided by producers to cover the cost of recovery logistics, invest in collection location facilities such as CRCs, introduce sorting hubs and wash plants (to allow dirtier materials such as plant pots to be collected), and equipment such as shredders and re-pelletising extruders.

The material pathways could then capture current unrecycled PP that other stakeholders would like to be able to recycle. Backing from other industry organisations could help secure funding, new working groups and a scheme, and create awareness that oversized and undersized items such as PP packaging caps can now be recycled.

The project co-ordinators, IP Plastics and SQ1, are calling out for collaboration from industry, Councils and Government to help develop and fund a programme to help scale PP collection pathways in and beyond the bounds of the Tāmaki Makaurau region.

6 Future demand

While growth is an important component of future demand, this waste assessment considers that the future demand for collection, recycling, recovery, treatment and disposal services within the Auckland region will be driven by a wider range of factors, including:

- An increased emphasis on reducing emissions from waste, which prioritises different waste streams to volume alone.
- An increased emphasis on developing circular systems that involve participation by industries, consumers and council acting together.
- An increased emphasis on actions taken higher up the waste hierarchy such as reuse, product stewardship schemes or extended producer responsibility, and methods to design-out waste, that potentially alter the volumes and types of waste currently collected by council.

This chapter discusses the future demand for waste services provided directly by council, the factors that will influence the way council delivers those services, and council's role in influencing and encouraging the responsible management of waste by others, including advocating for support from central government and industry.

A reduction in waste generation is the key to achieving a circular economy. If Auckland is successful in reducing waste generated, this will have a positive downstream impact on future demand for services.

The future demand for all waste services within the region falls into two categories, discussed in the previous chapter:

- Waste collected by the council and disposed of or processed under council's management, including waste generated directly by council, and
- Waste outside council's management.

As previously established, most of the current total tonnes to landfill generated within the region is outside council's direct management. It is difficult to establish with any certainty what the future quantities of this waste may be, though for effective waste minimisation in the region, this waste needs to be addressed.

Population growth will continue to be one factor driving demand, and some growth factors are interrelated. For example, increased population growth in particular areas should be accompanied by an increase in local economic development. Land use change will also be apparent, either because of that growth or to instigate and influence future growth patterns.

Some waste minimisation programmes aim to reduce consumption patterns upfront, while others seek to alter consumer waste behaviour by shifting the perception of wastes to a resource for beneficial reuse. Both these approaches are evident within Auckland Council's waste minimisation education programmes, and community reuse and recycling initiatives.

6.1 Demographics/population change

Population growth and its implications were outlined as one of three key challenges in the *Auckland Plan 2050 Evidence Report Update* published in September 2022[28].

The Auckland region is projected to grow from 1,695,200 people in 2022 to 2,027,000 in 2040[29]. Auckland currently represents just over one-third (33 per cent) of New Zealand's population, but Stats NZ population projections suggest that by 2048, Auckland could represent 37 per cent of the national population[30].

Rodney, Franklin and Upper Harbour are the local board areas that will absorb the highest numbers of new residents, growing by 60 per cent in Rodney, 57 per cent in Franklin and 52 per cent in Upper Harbour.

The three local board areas with the lowest projected growth are Kaipātiki (six per cent), Waitākere Ranges (seven per cent) and Ōtara-Papatoetoe (10 per cent).

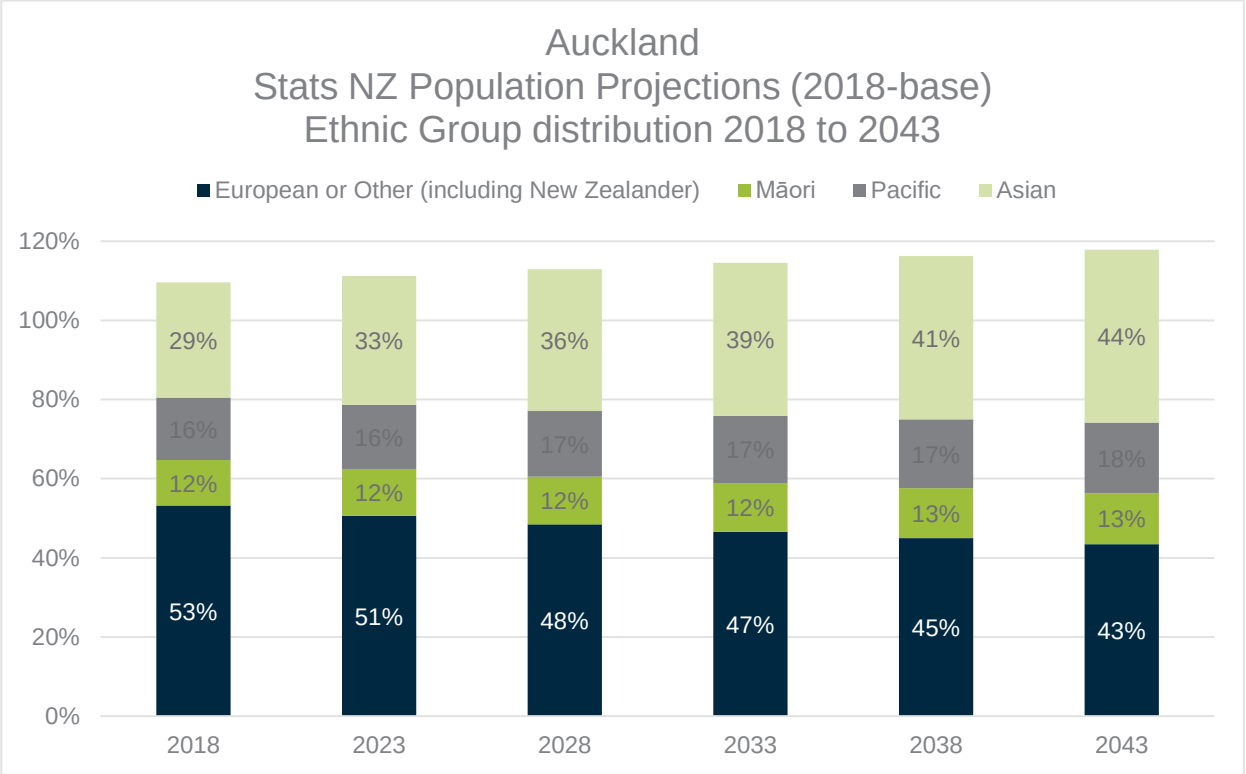
Table 26 Auckland region – Top five anticipated growth areas

Top 5 areas (by local board)	Estimated population change[31] (2022-2041)
Franklin	62,000
Rodney	56,000
Waitematā	48,000
Upper Harbour	35,000
Maungakiekie-Tāmaki	34,000

The population of Auckland is also predicted to go through massive cultural changes over the next 30 years, and by 2043 the region will look quite different to other parts of New Zealand, with significantly higher rates of ethnic diversity. For example, in the next 20 years, one in five Aucklanders will identify as Māori, and 40 per cent of Aucklanders will identify as South or East Asian.

[28] "Auckland Plan 2050 Evidence Report Update" by Auckland City Council's Strategy and Research Department, Sept 2022.
[29] Latest Auckland Council projections as of March 2023
[30] StatsNZ website, 2021.
[31] Sourced from Auckland Regional Transport Model (i11v6)

Figure 17 Auckland region population projection



More than 50 per cent of the workforce in Auckland by the 2030s, will be Māori, Pasifika, South Asian or East Asian.

We are also entering an era of hyper-aging. There is a rapid growth in the proportion of people over the age of 65 (19 per cent by 2048), and a significant number of those will live in Multi-Unit Developments (MUDs) in the form of retirement villages. The Pākehā cohort in particular, will be significantly wealthier than their children and grandchildren which will have implications for consumption patterns.

The rising population drives the need for housing intensification, experienced through an increase in the number of MUD properties both within the city centre and extending out to the suburbs. Auckland's Unitary Plan designates various zones within the city that allow for controlled population growth, predominantly focusing on areas identified as Metropolitan, Town Centre, and Mixed Housing zones. These zones provide the framework for increased housing density and development, including apartment living, while also considering factors such as infrastructure, transportation and community services to support sustainable urban expansion.

The council is mandated to make refuse disposal accessible to all households. Current demand is approximately 540,000 households and assumed demand will increase in line with anticipated household number increases. Stats NZ's latest projection for the estimated number of dwellings is 10,000 per year to 2051, which equates to an assumed demand of 850,000 dwellings.

Planning for and providing refuse and diversion services to MUDs in particular presents logistical challenges, as residents typically share larger communal bins and vehicle access can be limited. Contamination management is also more difficult to achieve as communal bins make the individual responsible difficult to identify and reduce the level of personal responsibility people feel towards what goes in their bins.

Meeting future needs for waste minimisation education that is accessible to the diversity of people living in the city and addresses a range of housing typographies (including MUDs) is important to enable effective diversion to continue.

6.2 Commercial and industrial activity/economic conditions

One key indicator of commercial and industrial activity and overall economic conditions is Gross Domestic Product (GDP). Though the total tonnes to landfill in recent years (shown in Chapter 4.2) has not closely followed GDP trends, GDP is still one of the best indicators of future commercial and industrial waste available. Nationally, the ongoing economic impact of the Covid-19 recovery means that GDP is more difficult to predict than pre-Covid-19, however the economic slowdown is anticipated to continue for the remainder of 2023, with conditions beginning to improve in 2024.

In particular, the future demand for commercial waste services is heavily influenced by the construction industry and the generation of C&D waste. In the National Construction Pipeline Report published by MBIE each year, the 2022 forecast for residential construction in Auckland through to late-2026 has reduced from the 2021 forecast, though taken as a range:

- Residential construction through to late-2026 is anticipated to be $8B - $10B /year, currently $12B.
- Total construction through to late-2026 is anticipated to be $16B - $19B /year, currently $20B[32]

Though forecast to slow down from current levels, this still represents a significant amount of construction in the Auckland region which requires consideration to prevent materials being disposed of to landfill, managed fills or clean fills where possible.

Current and proposed large-scale government projects in the region include:

- City Rail Link (CRL)
- Eastern busway
- Kāinga Ora public housing developments
- Healthy Waters programme of stormwater renewals and enhancements.

These projects and programmes have the potential to generate significant quantities of waste materials. However, as the Link Alliance and TROW Group have demonstrated on the CRL project, through careful planning and prioritising avoiding, reducing and reusing waste, significant amounts of this material can be diverted.

[32] Figures taken from the "National Construction Pipeline Report" published by Ministry for Business, Innovation and Employment, 2021 and 2022 for the Auckland region.

6.3 Flows to and from other regions

A significant portion of waste generated in the Auckland region is disposed of in the Waikato region at EnviroNZ's Hampton Downs landfill as included in Chapter 4. In addition, some domestic waste collected in the northern part of the region is disposed of to the Puwera Landfill, in the Whangarei district.

Although quantity estimates are not available, it is understood that there is also a significant amount of diverted materials flowing into Auckland for processing. This demand is generally catered for by the commercial waste/diverted materials market.

Due to the scarcity of suitable land in the Auckland region for future landfills and for the large-scale processing of diverted materials, solutions may involve facilities outside the Auckland region. However, this increases the environmental impacts of trucking waste long distances out of the region and also exports job opportunities from waste as a resource.

The projected waste to landfill scenario modelled below based on historical landfill data considers waste generated in Auckland and disposed of either to Auckland landfills, or out-of-Auckland Class 1 landfills in Puwera and Hampton Downs.

Subject to external factors, the current proportions of landfill waste and diverted tonnes both in and out of the region are anticipated to continue.

6.4 Projected future waste volumes

6.4.1 Data limitations and issues

As highlighted in Chapter 4, there are accuracy errors and limitations associated with the waste to landfill data for the Auckland region, which restrict the accuracy of waste estimates and demand forecast projections. The key limitations of relying on these data for establishing a baseline in Auckland are:

- The landfill data is provided by commercial landfill operators and has not been verified directly using weighbridge records noting waste source.
- Landfill data are highly sensitive to fluctuations caused by general economic conditions.
- Landfill disposal data comprises waste disposed of to Class 1 landfills, while tonnes disposed of to Class 2 landfills (construction and demolition fills) are not available to the council.
- Information provided through the council's waste licensing system is assumed to be accurate.
- Information regarding material quantities diverted through product stewardship schemes are not available to council, meaning gaps exist in the council's understanding of current industrial waste generation.
- The breakdown of waste through SWAPs is useful but is a snapshot at the point in time the SWAP is conducted and may not be a true representation of the waste being analysed.
- The amount of contaminated soil or other special wastes to landfill is highly variable and is linked directly to major infrastructure or remediation projects. Large one-off projects or other changes can have a significant impact on demand for landfill space. For this reason, apparent data outliers were excluded from the projection calculations.

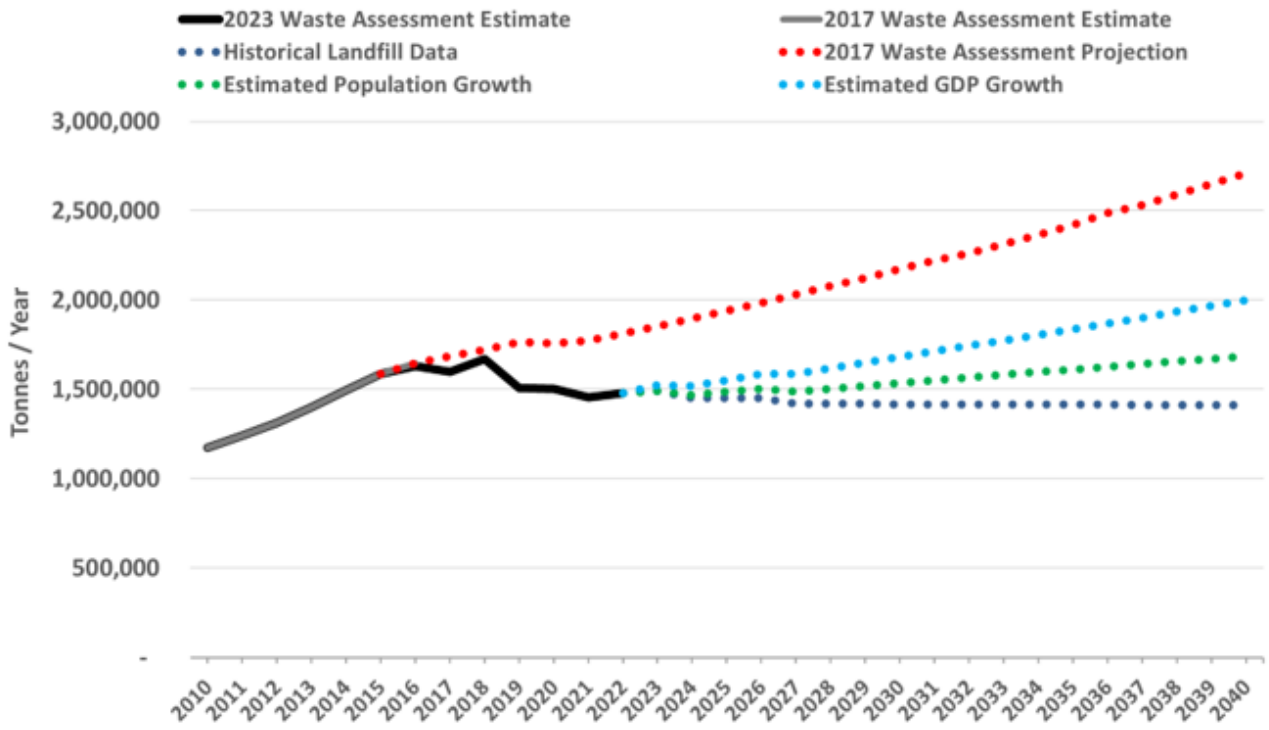
6.4.2 Forecasts

Considering anticipated growth and the drivers noted earlier, several different projections can be made on the waste generated within the Auckland region. These are provided within Figure 18, with waste generation predicted based on population growth, GDP growth, and tonnage projections based on waste to landfill figures recorded by Auckland Council for 2007-2022. With each prediction, these factors are applied in isolation, meaning that all other factors are held static (such as waste generation increase per capita).

The 2017 Waste Assessment Projection (red dotted line in Figure 18) was based on a combination of population growth estimates (applied to the domestic portion) and GDP growth estimates (applied to the commercial portion). The actual waste to landfill estimates since 2016 (2023 Waste Assessment Estimate, black line in Figure 18) were better approximated by population growth than by GDP. Therefore, estimated population growth has been selected to be the best predictor of landfill projections from 2022 (green dotted line). This predictor sits between projections based on GDP (blue dotted line) and projections based on regression analysis of historical landfill data (dark blue dotted line).

Each of the waste to landfill projection models illustrated in Figure 18 also incorporate the effect of the food scraps collection service from 2024 and a fortnightly refuse collection service from 2027. The projections presented in the graph do not consider quantities of biosolids which may require disposal. Biosolids from Mangere Wastewater Treatment Plant that will require an alternative treatment from the early 2030s, following the completion of the Puketutu Island rehabilitation project, and this discussed in the following section.

Figure 18 Auckland regional waste to landfill projection



These projections are estimates only and are based on several broad assumptions and derived data. However, they show a continued slow upward trend in waste generation even with reductions in average waste per capita resulting from new services intended to support waste diversion.

Figure 19 presents the selected waste to landfill projection, as predicted by population growth projections and planned waste reduction initiatives, combined with waste composition data.

Figure 19 excludes special/potentially hazardous wastes. This is because audit results for this waste type can be extremely variable due to the less consistent nature of disposal – e.g. potentially contaminated excavated material may or may not enter the facility at the time of the audit. The exclusion of this category is consistent with the approach taken in the previous waste assessment.

Based on the available information, modelling projections, and assuming a 'business as usual' approach to future waste management, rubble/concrete, timber and plastics are the three waste streams with the largest expected increase over time (domestic and commercial wastes/sources combined). Textiles and garden waste also show a significant increase.

Figure 19 Auckland regional waste to landfill projections – with estimated composition breakdown (excluding special waste)

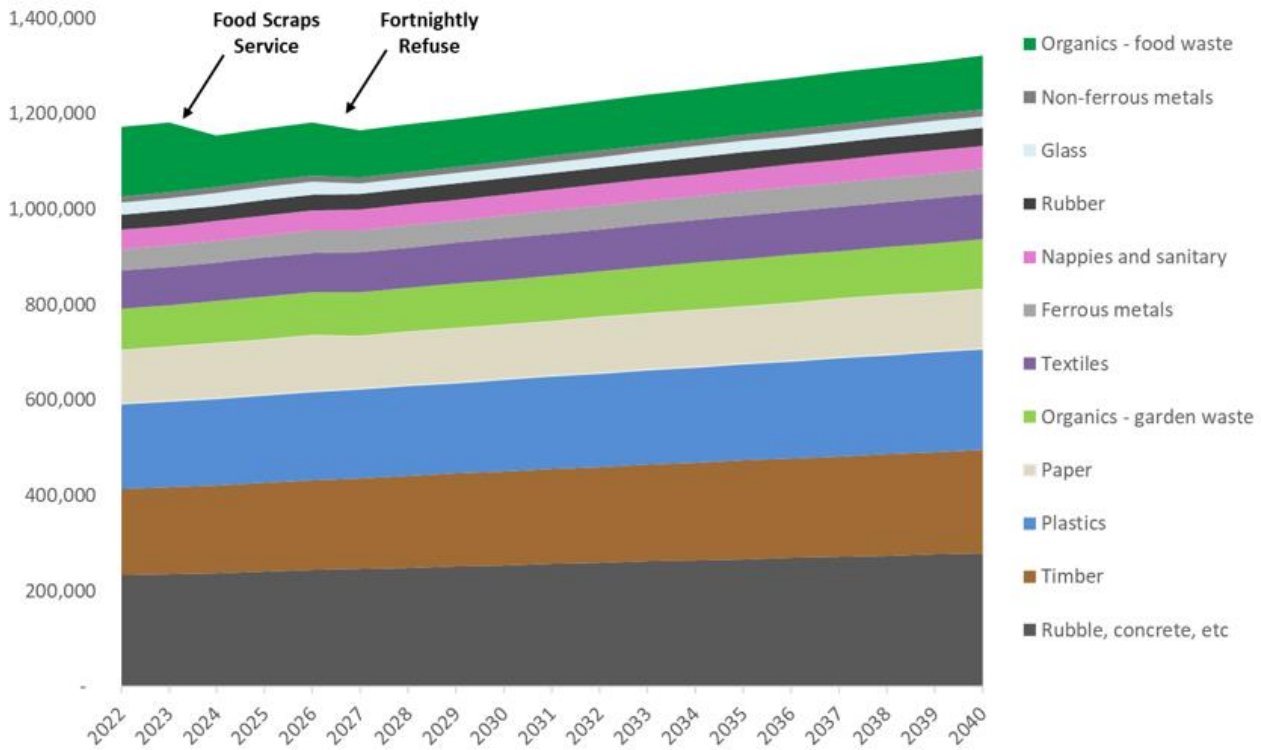


Table 27 Summary of projected waste to landfill in 2040

Material	Projected annual tonnes by 2040	Change in tonnes from 2022
Rubble, concrete, etc	279,000	+++
Timber	216,000	++
Plastics	212,000	++
Garden Waste	103,000	++
Textiles	95,000	+
Paper	127,000	+
Ferrous metals	52,000	0
Non-ferrous metals	15,000	0
Nappies and sanitary	49,000	0
Rubber	37,000	0
Glass	25,000	-
Food waste	112,000	--

Key:	
0	< +/- 8,000 tonnes/annum
+/-	+/- 10,000 – 20,000 tonnes/annum
++/--	+/- 30,000 – 40,000 tonnes/annum
+++/---	+/- 40,000 – 50,000 tonnes/annum

The anticipated increase in proportion of the total waste stream, and the overall tonnage increase, is driven by a combination of population and economic growth. A decrease in total tonnage is shown in 2023-24 due to the introduction of the kerbside food waste collection service is introduced, and a further decrease is shown in 2026-27 in anticipation of a move to fortnightly refuse collections.

It is significant that the top two categories (rubble and concrete, and timber) expected to increase the most by 2040 are both related to the C&D industry. Many of the projects leading to the increases in these

materials are essential for the continued growth and renewal of infrastructure, housing and other facilities that support the region's population. There is limited opportunity to avoid this waste. As previously noted, this is also a waste stream largely managed by the private sector and not by the council. Construction waste continues to be a key consideration on all projects delivered by the council and its CCOs. Refer to Chapter 8 for further discussion about this priority waste stream and the options recommended for managing it in the future.

Plastics comprises both recyclable and non-recyclable plastics, with non-recyclable plastics dominating this category. The increase of both Plastics and Textiles is reflective of the increased rate of consumption of goods by the general population.

The reduction in Food Waste tonnes to landfill is a direct result of the kerbside food scraps collection currently being implemented by the council.

Figure 20 compares current and projected levels of waste to landfill for Auckland against the current WMMP aspirational target of zero waste to landfill by 2040. This figure further emphasises the challenge Auckland faces.

Figure 20 Projected waste to landfill versus Auckland's current WMMP target

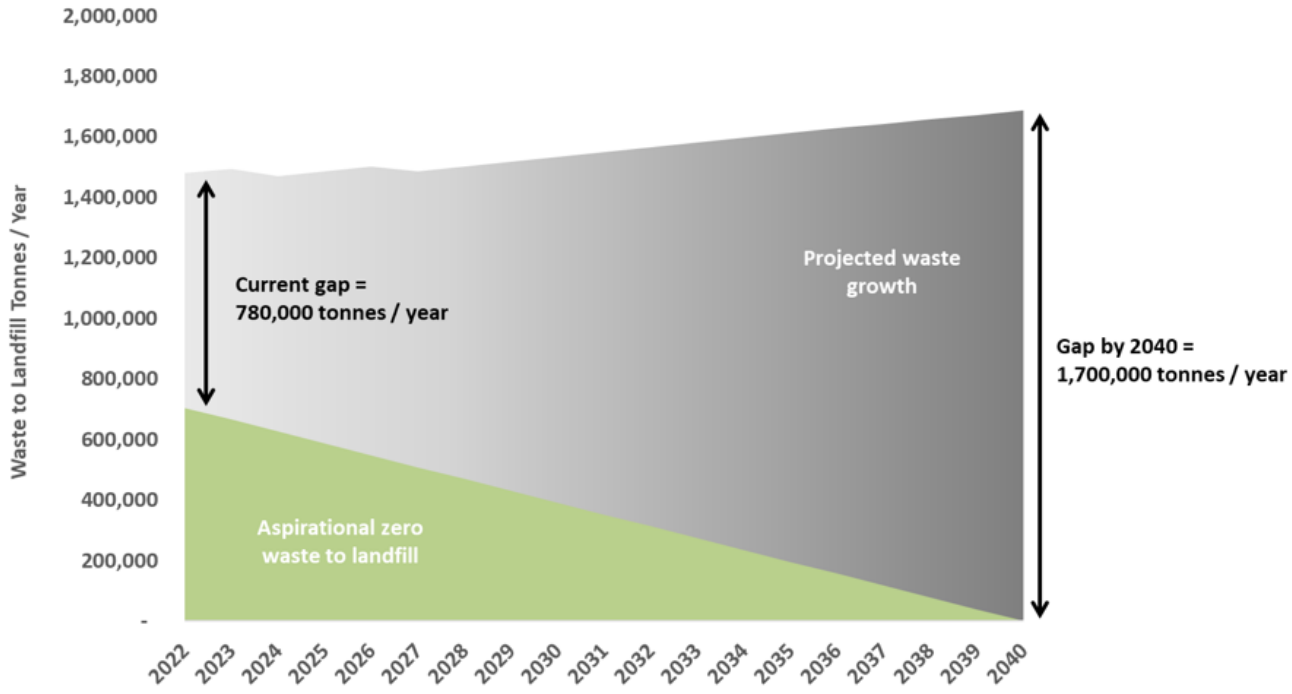
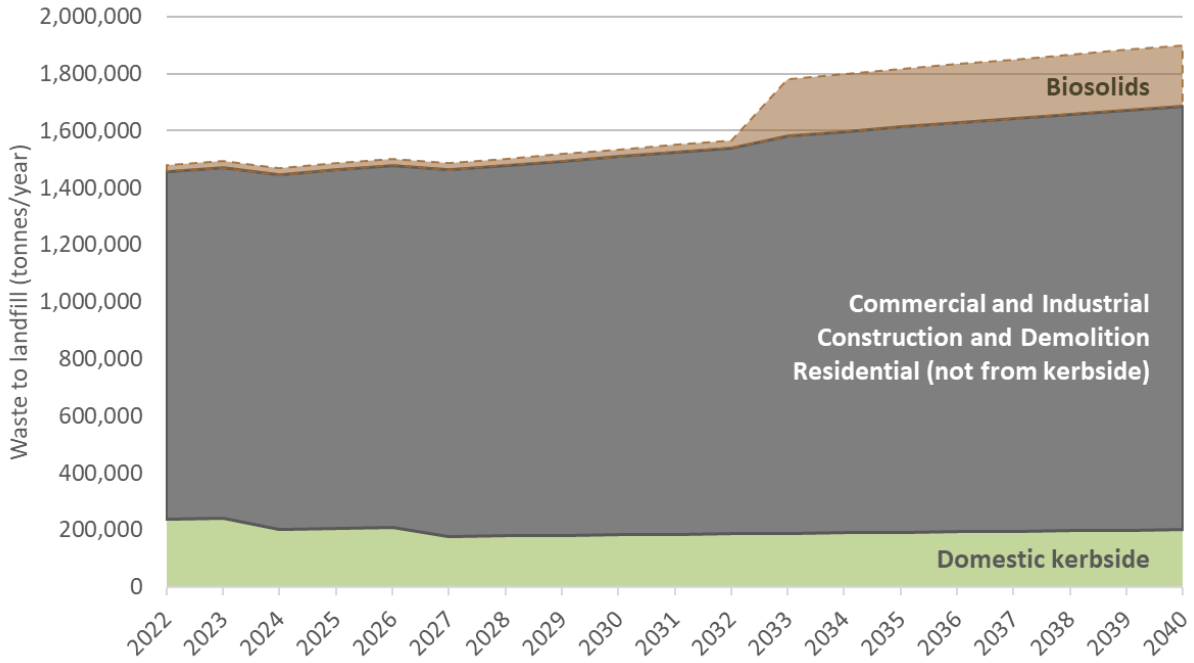


Figure 20 and Figure 21 both present tonnage projections for the total waste stream, including domestic and commercial waste sources. As per the Waste Minimisation Act 2008, these wastes are all within the council's remit, despite the limited proportion within the council's direct influence (e.g. kerbside waste).

Figure 21 is a projection of domestic kerbside waste compared to the other sources of wastes disposed to landfill, including their relative proportions. The projected quantity of biosolids disposed to landfill is also presented which assumes all biosolids from Watercare's operations are disposed to Class 1 Landfill following the completion of the Puketutu Island monofill in early 2030s. The rate of increase in the commercial waste component could slow if regional development slows in coming years, and as more

initiatives to reduce C&D and other commercial waste are introduced. The projection assumes 'business as usual' aside from planned changes to the domestic kerbside service (food scraps and fortnightly refuse). However, the relative proportion of domestic wastes will remain much smaller than commercial.

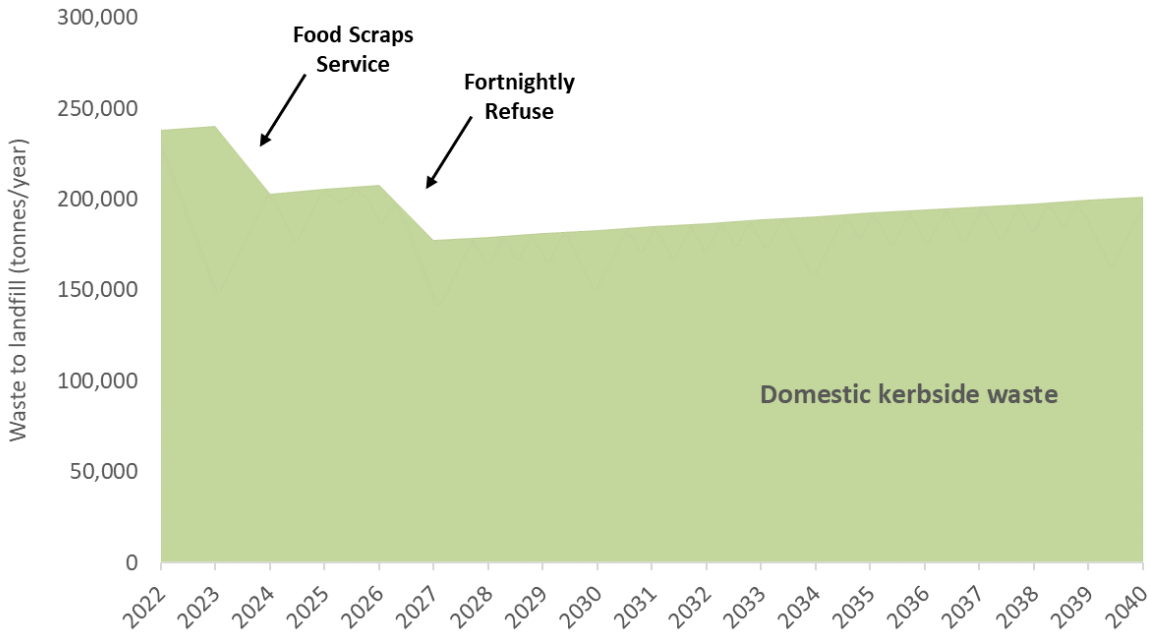
Figure 21 Relative proportions between Auckland's projected quantities of biosolids, commercial wastes, and domestic kerbside wastes disposed to Class 1 landfills*



** Assumption that all biosolids from Watercare's operations are disposed to Class 1 Landfills from early 2030s.*

Figure 22 illustrates domestic kerbside waste to landfill, with the significant decrease predicted to occur from 2023 with the introduction of the urban food waste collection and planned fortnightly refuse collections from 2026.

Figure 22 Forecast of domestic kerbside waste to landfill



6.4.3 Future biosolids quantities and management options

The quantity of biosolids produced at Auckland's wastewater treatment plants is expected to reach 200,000 tonnes per year by 2030. The majority of this is currently not being disposed to landfill, instead it is used to rehabilitate Puketutu Island next to the Mangere wastewater plant. Once this rehabilitation project is complete, alternative options are needed to manage the significant quantity of biosolids generated. In addition to ongoing work by Watercare to reduce the quantity of biosolids produced, Watercare will start working with mana whenua, communities and stakeholders to identify options and form a collaborative plan for the future of biosolids. At a high level there appear to be only four viable solutions:

- Class 1 landfill
- A new industrial monofill, similar to the current rehabilitation of Puketutu Island
- Dryer-incinerator (noting no net energy as the dryer consumes all energy generated)
- Beneficial reuse through land application as a fertiliser / soil amendment (the only scenario that is not "waste")

Such solutions will need to reflect iwi/Māori and community priorities, and require alignment with national and local regulatory frameworks, including Water NZ's draft "Guidelines for Beneficial Reuse of Organic Materials on Productive Land, 2018". The draft guidelines support reducing waste to landfill while allowing for the safe and beneficial use of a wide range of organic materials (including biosolids) be applied to land, and safeguarding the environment and local communities from key risks relating to a range of contaminants present in biosolids.

6.4.4 Forecasted disposal capacity

As discussed in section 5, there are currently four operational Class 1 landfills serving the Auckland region, along with numerous other disposal facilities classified as Class 3 to 5 landfills. Given their size, the Class 1 landfills at Redvale and Hampton Downs will contribute more to the resilience of Auckland's disposal infrastructure over the next five years, as the landfills at Puwera, just north of Auckland's border, and at Whitford are constrained to offer long term supply of landfill space.

Depending on extending current resource consents, the combined capacity of these four landfills should be sufficient to service Auckland's waste disposal needs up to 2040 albeit with some operational constraints, however beyond that date there is greater uncertainty. At the time of writing, the future of a proposed landfill by Waste Management NZ Ltd at Wayby Valley in Auckland's north sits with the Environment Court. The application for resource consents for the proposed landfill was approved by four of five Independent Commissioners in June 2021, however the application for a change to Auckland's Unitary Plan to designate the land as a disposal precinct was declined.

Redvale Landfill's resource consent is due to expire in 2028 and while Auckland Council does not know how much remaining airspace exists at that landfill, it is assumed the site will continue receiving waste at the same rate as current until 2028.

While Whitford Landfill has consents to operate until 2041, it is smaller than Hampton Downs and Redvale, and there are restrictions on vehicle movements to and from the landfill which limits the annual volume that can be received at the site. As such, this landfill cannot be relied upon as a complete solution for Auckland's waste after Redvale's closure.

Hampton Downs in the Waikato Region has resource consents until 2036 for solid waste disposal. Strategic consideration is required regarding whether the Auckland region, beyond 2030, should rely on transporting the majority of its residual waste, including potentially large quantities of biosolids, to the Waikato. This represents a particular disposal capacity challenge for wastes generated in the north of Auckland due to operational and transport network resilience, as well as the environmental, cultural, economic and social challenges this presents.

The lead in time required to identify, designate, design and build new Class 1 landfill infrastructure at a minimum is approximately seven years, so there are risks for Auckland regarding developing alternative options if the Wayby Valley proposed landfill operation does not proceed.

6.4.5 Projected diverted materials

Economic fluctuations also have an impact on the supply of, and demand for, diverted materials, with international trends and market values coming into play as well as local conditions. It is generally expected that volumes of diverted materials will show a similar trend to waste projections and vary in accordance with the factors that influence waste generation such as population, economic growth, consumption, and production patterns.

Various factors will also impact specifically on the market for diverted materials which will divert more/less material from landfill. Demand for, and supply of, substitute resources, product quality, overseas markets and transport costs, and processing centres as well as other community and waste minimisation programmes will influence the amount of waste that becomes diverted material.

It should be noted that volumes of diverted material can also be affected by reduction in waste generation – the NZWS has a target to reduce waste generation by 10 per cent. Upstream efforts to reduce waste and a shift towards a circular economy would ideally see a reduction in material entering the waste management system as a whole. This is a scenario where no or slow increases in diversion is counter-intuitively a good news story.

With demand and supply determining the competitive market price, it is expected that as the price for diverted materials increases, supply will also increase and more material will be diverted from landfill. Conversely, if the commodity price of diverted materials drops below the cost of collection and landfilling, it is possible that diverted materials may once again be landfilled, stockpiled, and/or require additional subsidy.

Historical trends have shown considerable variation in the size and value of reuse markets, as well as changing specifications to suit technological and other changes taking place within those markets. Lower value commodities, more susceptible to market variability, include various grades of plastic and glass. However, recent years have seen market value fall even for typically higher demand materials such as recovered metals.

6.5 Changing priority waste streams and source reduction

In New Zealand and globally, the solid waste industry's focus has shifted over the last decade from largely measuring waste in terms of the landfill space consumed, to understanding the emissions associated with different types of waste in landfills and prioritising the reduction of emissions associated with waste management. This change is evident in the legislation around waste management and the recently released NZWS, which emphasise sustainable waste practices, recycling and minimising GHG emissions.

Auckland Council's priorities have also shifted since the last Waste Assessment following the declaration of priority products for product stewardship in 2020.

Advanced technology around alternative options for these waste streams and the rising cost of landfilling these materials have also contributed to new waste streams being included for diversion potential in this waste assessment. There are shifts happening in circular economy and product policy which has resulted in the government proposing to go further with new powers, for example environmental performance requirements for products that cover resource efficiency areas such as durability and repairability. These powers will mean that potential waste streams are looked at and addressed in new ways.

Priority waste streams are discussed further in Chapter 4.7 and Chapter 8.1.

6.6 Advocacy, facilitation and education

Zero Waste and the transition to a circular, regenerative economy is climate action. Waste minimisation offers more for GHG emissions abatement that simply cutting methane from landfill.

The government has an important role to play in influencing a reduction in waste generation which is the step change we need and what ties waste to the circular economy. Auckland Council has been at the forefront of advocating for many of the changes now adopted in the NZWS. The Government has proposed to update New Zealand's waste legislation and in May and August 2023, five Cabinet Papers confirming decisions relating to the details of these new laws were publicly released. It is anticipated that a draft Bill may be introduced to the House in late 2023 or early 2024, with enactment in 2025. Among other things, the new legislation will support the recently released NZWS's implementation, which is anticipated to

impact future demand for waste services in the region over an extended period of time, as the NZWS becomes more widely understood and implemented across different industries.

The NZWS includes goals, targets and commentary that stretch across all layers of the waste hierarchy, with a renewed focus on the preferred top layers – prevention and reuse. This includes a target to reduce waste generation by 10 per cent by 2030, and a goal entitled "Using less, for longer". To achieve the latter by 2030, the NZWS states the government must focus on supporting more circular business models and practices, making it easy and cost-effective to repair things, and creating more systems and facilities that support things being reused. Council can support the realisation of these high-level commitments through advocacy, walking the talk and facilitating and supporting circular activity in the region.

Alongside advocating to central government, the council has been endeavouring to "Walk the Talk" as a role model to business and industry to show how non-domestic waste can be reduced. With the NZWS and supporting legislation, the council will play an increasingly pivotal role in facilitating responsible waste disposal practices in areas outside the council's control, such as commercial and industrial waste.

The council has no direct role in the generation and/or disposal and processing options for this waste but can influence outcomes through demonstrating responsible waste management in its own operations and through its procurement processes and facilitating industry to do the same.

Chapter 8 discusses the options available for the council's involvement in this area, however the potential to influence the future demand for waste services through advocacy, facilitation and education is recognised here.

Furthermore, council will continue to actively engage with central government to advocate for other regulatory measures, such as product stewardship schemes extended producer responsibility schemes and a national beverage container return scheme (CRS). If introduced, a legislated CRS would increase demand on services to collect/ aggregate CRS materials, as well as increasing demand on recycling or exporting infrastructure/ services. This would also have a flow-on effect to markets for diverted materials which may need to be further developed.

In relation to EPR/PS schemes, the beverage CRS, and product policy more generally, Council will advocate for government to increase use of regulatory tools and economic incentives for driving circular business activity up the waste hierarchy, as this will help to reduce waste generation (i.e. materials entering the waste management system).

This includes measures to drive an increase in reusable and refillable beverage packaging systems. In the context of EPR/PS schemes, measures to increase top of the waste hierarchy activity can include minimum product reuse targets, alongside scheme fees that cover the costs of recovery for reuse and preparation for reuse.

Outside the context of EPR/PS schemes, there is the potential to use economic instruments such as levies to incentivise or disincentivise certain products and activities, or command and control measures to complement the current use of bans, such as the proposed environmental performance requirements for products for resource efficiency (e.g. durability and repairability), binding targets at the top of the waste hierarchy (e.g. consumption reduction targets for certain products/materials) or mandating reuse activity in certain contexts.

By leveraging their influence as community representatives, councils can champion policies that not only enforce responsible waste disposal but also incentivise the integration of eco-friendly technologies and practices within commercial and industrial operations. Through these activities, the council can impact the demand for future waste services.

6.7 Residential behaviour

6.7.1 Understanding consumer attitudes towards waste

Consumer behaviour is a key driver for household waste generation. The council has engaged with the users of their domestic services to seek feedback on how the collection services and education programmes can be more effective. These findings are incorporated into the Options in Chapter 8 and are anticipated to continue to impact the future demand for council's services.

In 2022 Council engaged Kantar Public to carry out an online survey to understand Aucklanders' knowledge, behaviours and attitude towards recycling. Key insights gained from this study include:

- Aucklanders fall into four categories with attitude towards recycling: 21 per cent Advocates and Attainers, 31 per cent Fluctuating, 37 per cent Followers and 11 per cent in Denial.
- 94 per cent of Aucklanders take personal responsibility for recycling within their household.
- Most Aucklanders can identify most items as recyclable or non-recyclable reasonably quickly, however there are common misconceptions about items like compostable coffee cups, till receipts, plastic straws etc.
- Behaviours around rinsing, lids, crushing of cans and flattening of boxes varied across all types of respondents, suggesting more education would be beneficial in this area.
- Bin stickers are the most preferred form of education with clear concise messaging and placed in a relevant location.

In 2019 the council engaged Colmar Brunton[33] to conduct a series of focus groups around the council's kerbside services and their delivery. Key insights gained from this study about domestic customers and their behaviour include:

Areas where customers rated council's kerbside service highly for refuse and recycling were:

- Trustworthy, reliable service
- Bins emptied fully
- Collector staff friendly and approachable
- Ease of payment and purchase options
- Behaves responsibly towards the environment

Areas where customers considered council could improve their service to support better outcomes included:

- Providing services in different languages
- Keeping customers informed about the services available to them
- Being transparent about what happens to the waste after collection
- Education on how to recycle properly

[33] "Kicking Misconceptions to the Curb – Insights on Auckland's Waste Management Landscape" by Colmar Brunton on behalf of Auckland City Council, 2019.

By continuing to seek feedback and monitor the effectiveness of the services being delivered, the council will continue to influence the way services are utilised by customers in the future.

6.7.2 Delivery of kerbside services

The introduction of the kerbside food scraps service, including servicing MUDs, and the planned move from a weekly to fortnightly refuse service is anticipated to impact demand by driving the diversion of up to 45 per cent of the bin waste that is food away from refuse.

Further, a fortnightly refuse collection service was consulted on as part of the preferred option presented in the case for a rates-funded model but will be consulted on again before making a decision whether to introduce this service frequency change.

Research by the Organization for Economic Cooperation and Development (OECD) indicates that household waste generation is influenced by factors that include:

- household size, age and composition, and income
- attitude toward the environment and recycling
- presence of volume-based/polluter pays charging systems for waste, and collection frequency
- presence of infrastructure and services to enable resource recovery
- technological shifts/product supply changes
- increased product packaging[34].

The form of kerbside waste and diversion services (frequency, receptacle, etc.) are within the council's greatest ability to influence future demand for waste services.

This is consistent with the findings of a study carried out on behalf of the council in 202135 which found that to achieve the council's domestic waste minimisation goals, efforts should be focussed on:

a. diversion services that are easy to use
b. community education programmes to maximise awareness and knowledge about using the services properly and creating a sense of responsibility, and
c. reducing available refuse volume.

Auckland Council's past and present waste plans support the impact these changes are likely to have on future demand. The introduction of city-wide kerbside 240L recycling bins saw a step change downwards in the refuse generated. The reduction from 240L to 120L standard refuse bin sizes in legacy Auckland City and swapping from unlimited bags to a 120L refuse bin in legacy Manukau City resulted in a 40 per cent reduction in recycling weight placed in the refuse bin, and an overall reduction in refuse weight of 35-50 per cent.

Reduced frequency refuse collections are very common overseas. Many UK councils moved to 'Alternate Weekly Collections' (AWCs), alternating fortnightly refuse and recycling collections over a decade ago, and a growing number of councils in England and Wales are now moving 3-weekly or monthly residual waste collections. Evidence consistently shows that improved recycling rates are achieved with less frequent refuse collections. Councils in Aotearoa New Zealand are following suit, for example Hamilton introduced

[34] OECD, 2002, Towards Sustainable Household Consumption? Trends and Policies in OECD Countries, OECD Publishing
[35] "Refuse Collection Advice – Summary of findings" by Morrison Low, May 2021

fortnightly refuse collections in 2021 and Central Otago introduced the same in July 2023. In both these cases, standard bin sizes of 120L are offered.

Evidence in support of a move to fortnightly refuse collection

Once the food scraps service is bedded in, a standard fortnightly refuse service is expected to meet the needs of most residential households. For those households that need extra support, there are a range of options that the council can deploy to ensure no one is left struggling with a bin capacity that does not meet their needs.

For example, a large household can access a 240L refuse bin, which, collected fortnightly, would be the equivalent capacity of the current standard offering of 120L refuse collected weekly which most households already have. Modelling the cost of each service under a fortnightly offering, the charge for a 240L refuse bin collected fortnightly would likely be equivalent to, or less than the current weekly 120L service cost because the largest portion of service costs is related to collection, rather than disposal.

As Auckland Council charges its services based on cost recovery only, the council can ensure that large households are not financially disadvantaged, just because they need more capacity, while ensuring that cost savings gained from running collection vehicles less frequently (ie fortnightly) are able to be passed on to the whole community through the reduction in collection costs.

The largest waste producing households in Auckland tend to be in Auckland's south, where the number of people per household can exceed 10 people, particularly when friends or whānau visit for extended periods.

Auckland Council approached Te Awa Ora Trust to conduct research with ten households (five from Manurewa and five from Papakura) to gather data on how large or diverse households will manage their waste with current and future waste services such as fortnightly refuse collection and food scrap bins.

Households were selected if they represented one or more of the demographic grounds including whānau with young children in nappies, whānau with family who use additional sanitary and medical products due to age or disability, low-income households or people experiencing financial hardship, household with more than six people, Māori and Pasifika whānau, ethnic communities and residents in Kāinga Ora homes.

The research was conducted in three phases, a baseline phase to assess how much refuse, recycling and food scraps each house was generating on a weekly basis, then a second phase where the refuse collection was reduced to fortnightly, and a third phase where fortnightly continued, but education and engagement interventions were offered.

The research found that while households initially struggled with fortnightly refuse collections, following zero waste education they seemed to manage much better (note some households only had a 120L refuse bin). At the end of the survey period, the average weight of refuse had dropped from 14.5kg per week at the beginning of phase 1 to 9.6kg at the end of phase 2 to 8.6kg per week at the end of phase 3. The weight of organics (food waste) and recyclables dropped significantly – by 65 per cent and 58 per cent respectively.[36] However during both phases, the volume of nappies and sanitary items stayed about the same.

[36] "Household Waste Case Studies" prepared by Te Awa Ora Trust, October 2022

Due to the low number of households, conclusions need to be treated with caution, however the findings suggest that:

- Changing to fortnightly refuse collections and providing a food scraps bin results in a reduction in household refuse and an increase in diversion of food scraps and recycling.
- Providing information to households on managing their waste leads to further reductions in refuse, so it is important to engage with residents when changing to fortnightly collections.
- Aucklanders, provided they have the right sized refuse bin for their household, should be able to manage with a fortnightly refuse service.

There are many examples of policies to support larger households by councils that offer a reduced frequency refuse collection, for example, in Maidenhead, Kent (UK), larger/additional bins can be provided to households of six people or more, five or more with a baby under two in nappies or those who have a medical need (such as disposal of incontinence wear or packaging related to medical treatment at home that cannot be recycled). Councils in Wales offer larger bins with similar criteria. In New Zealand, Hamilton only offer a 120L refuse bin and Central Otago has issued all residents with a 140-litre bin with no upsize option until after a 3-month 'settling in' period. Equivalent criteria could be considered in Auckland.

Evidence supporting an optional monthly service collection

As Auckland Council gains a better understanding of the waste behaviour of Auckland households, we can see there is also a potentially large portion of the community who are very low waste producers.

Some of the feedback received from consultation on the move to rates funded was that many households produce very low waste volumes, and would not even use the full capacity of a fortnightly service frequency.

To understand what sort of service this could be, staff needed to understand the volumes of waste a household self-identifying as low waste generators would set out per week, fortnight or month.

In order to be fair and equitable, the service option needs to be available to all households, not just specific housing typologies or land uses such as pensioner housing.

A small trial was conducted, using households who self-identified as being low waste generators, to understand what the average waste volumes are like for Aucklanders who use the Council kerbside refuse service infrequently (once every 3-4 weeks).

Participants were identified from within the Council whānau of kaimahi. Households were told to consume and fill their bin as they normally would, and that the research would inform a further stage of feasibility around whether operationally we could offer a less frequent (monthly) collection, at a lower cost, to households that did not produce much waste.

Participants were asked to hold off on setting out their refuse bin for a four-week period, while using their food scraps and recycling service as normal. Waste Solutions staff then surveyed the fullness of their refuse bin when the bin was set out on week four.

24 households participated in the research, ranging from one-person households to five-person households. All households had either 120L or 140L refuse bins.

Number of people in the household	Number of households
1	2
2	7
3	5
4	7
5	1

Results

After four weeks the fullness of the bins was assessed, and the following results found:

Fullness of bin	Number of households
¼ full	3
1/3 full	3
½ full	6
2/3 full	3
¾ full	6
full	3

A visual audit of the bins revealed the majority of waste left in the refuse bin was soft plastic, PPE/face masks, cleaning cloths, vacuum cleaner bags/dust, small pieces of paper/cardboard.

From this trial we can conclude that not only do very small households have the capability to reduce their waste substantially, but average sized households with three or more people can achieve this as well.

We can also conclude that these households have embedded waste minimization practices into their everyday habits to the point where they can easily manage their waste for a month, and some households for much longer than that, having not even half filled their refuse bin after one month.

6.7.3 Education and engagement

Council has delivered a number of ongoing engagement and education programmes (outlined in Chapter 5.1) which are anticipated to continue to influence residents' attitudes towards waste and awareness of the diversion services available to them either through council or through other providers. The need for

education and engagement is anticipated to increase with increased access to diversion services (both kerbside and community based) and the increasing diversity within the Auckland population.

Community-based educational programmes aim to reduce household waste generation by targeting attitudes towards the environment and recycling. Auckland Council delivers a range of programmes under the Waste Education Strategy, separately targeting children and schools, as well as providing educational resources for adults.

Expanding on this role, we propose to engage more with Auckland businesses, (which is aligned with Goal 4 of the NZWS), helping identify and promote circular business models, initiate collaborative brainstorming find solutions (for example building support for Tātaki Auckland Unlimited circular business initiative XLabs), working with the commercial sector to shift up the waste hierarchy as part of our education and engagement programme, and encouraging the move to more circular models.

6.8 Balancing demand for recycling end markets

The future demand for recycling collection and processing in the region will be influenced by changes in NZ-based and off-shore end markets, and by changes further up the waste hierarchy that impact the waste streams that council currently collects for recycling.

All recycling services are dependent on the availability of end markets to receive the materials collected and processed. When no end market for a certain material is available, the rationale for separate collection and processing of that material also disappears. This has been seen with plastics #3, 4, 6 and 7, which are being phased out of the kerbside recycling collection in 2024.

There is a complex array of local and international economic and regulatory mechanisms affecting the council's ability to operate the recycling collection service as intended. There are limited markets for recyclables collected by the council within NZ, and NZ is not geographically close to all offshore recycling markets. Exports tend to therefore concentrate in the Asia-Pacific region, including, India, Korea, Malaysia, Indonesia and Australia, and shipping adds significant cost and vulnerability to the process.

These offshore markets are affected by fluctuating global commodity prices, waves of competition from other countries to get material into over-saturated markets, increasing quality standards and the need to remove non-conforming materials ('contamination'), shipping constraints and a growing number of international import and export bans via treaties such as the Basel Convention. Not to mention growing public and political disquiet about waste exports to developing countries[37].

These factors all add cost and complexity to the kerbside service, in addition to the operational requirements and associated costs to sort, market and transport recyclables to end markets. Commodity pricing for recyclable materials does not often cover the total costs associated with local collection and sorting operations, or the distribution and shipping costs required to get materials to offshore end-markets.

Yet as a small nation, the economic rationale for creating onshore resource recovery systems, such as building reprocessing and recycling plants, does not always stack up either. Supporting the development of NZ-based recycling end markets increases the reliability of recycling across the country, while (in most

[37] Petition for New Zealand to ban plastic waste exports to developing countries; slated as 'waste colonialism' - NZ Herald

cases) lowering the carbon footprint and cost associated with transporting materials overseas. Transparency also increases as the product of the recycling process remains local.

There is perhaps an even stronger argument here in NZ therefore - more so than Europe, Asia or the US - to reduce overall single-use packaging consumption by supporting the establishment of reusable packaging systems that reduce our reliance on costly recycling solutions that are vulnerable to geopolitical shocks.

Most recyclable material collected from kerbside is single-use packaging, including cardboard boxes, glass and plastic bottles, or aluminium/metal cans. New Zealand-based research into reuse systems for consumer-facing packaging is beginning to explore New Zealand's existing reusable packaging landscape, as well as the potential opportunities for reusable packaging systems to displace single-use packaging, which would relieve the burden on council kerbside collections. Furthermore, central government has started allocating funding to some reusable packaging projects to scale impact, including through the Plastics Innovation Fund.

6.9 Waste Levy Funding

Continued disposal of waste to landfill is incompatible with Auckland's aspirational goal of achieving zero waste to landfill by 2040. In 2020, Auckland Council submitted to the central government supporting a proposal to increase the landfill levy. The council's submission supported a best practice[38] levy increase from $10 per tonne to $140 per tonne to disincentivise waste to landfill and enable more funding for ambitious and wide-reaching circular economy and resource recovery programmes.

The levy increase that the Government agreed on was a gradual increase between 1 July 2021 from $10 per tonne of waste to $60 per tonne of waste to landfill by July 2024, and an expansion of the levy to class 2-4 landfills and reporting requirements to class 5 landfills.

The purpose of the levy in part, is to raise revenue for the promotion and achievement of waste minimisation. Currently, councils in New Zealand get a 50 per cent allocation of the funds generated on a per capita basis calculated from tonnages of waste sent to landfill from within their region. This funding is returned to them to invest in waste minimisation initiatives that will assist their community and economy to address waste generation. Council is strongly advocating for this allocation to continue and this waste assessment is based on this premise.

Auckland Council's experience in administering its own Waste Minimisation and Innovation Fund, a pool of $500,000 that can be granted to community groups and local businesses with innovative waste minimisation initiatives, that there is a large amount of interest from smaller enterprises in reducing waste of all types.

The resource recovery sector is increasingly working up the waste hierarchy where it can, and that is the area that needs investment, along with designing out waste and waste avoidance. Council has seen firsthand the power of ramping up the capability of community organisations. The results are substantial - through material recovery throughput, financial turnover leading to higher rates of training, job opportunities, integrating people who are marginalised back into the workforce, and building community resilience.

[38] Wilson et al, Eunomia, 2017. The New Zealand Waste Disposal Levy: Potential Impacts of Adjustments to the Current Levy Rate and Structure: Final Report

Councils are well placed to facilitate funding those initiatives while scanning for emerging waste issues and opportunities to influence change. Starving councils of funding by assigning a smaller proportion of levy constrains local government from becoming more involved in activating solutions that avoid and minimise waste generation, and stimulating economic activity that helps close the loop on resource use in a circular economy.

Large corporates in the waste and resource recovery sector do not have the same legislated waste minimisation obligations. They also have access to financial channels that do not exist for councils. Councils have responsibilities that will remain largely unchanged under the new waste legislation.

For the remaining 50 per cent of the levy that is contestable and distributed to initiatives by MfE via the Waste Minimisation Fund and Plastics Innovation Fund, expenditure has been ad hoc in the past, outcomes not transparent or measurable, and in some cases has inequitably benefited private initiatives that don't serve the community.

Auckland Council advocates for these funds to be allocated more strategically, targeted at activities focused at the top of the waste hierarchy, addressing waste generation at source, and funding the transition to a circular and regenerative economy. There could be greater collaboration with Councils to ensure the benefits of all levy spending impact is optimised.

Contestable levy funds must include a requirement for mandatory public reporting on tonnages avoided and diverted, and how that is achieved.

6.10 Summary of future demand drivers

Pressure on existing waste management and minimisation infrastructure and services will continue until change comes about as a result of successful source reduction initiatives. While there is adequate landfill disposal capacity in the near to medium term future, current methods for minimising waste are not achieving the 2018 WMMP targets.

The demand for future waste services in the region is a combination of:

- Strong population growth forecast to continue, along with associated economic activity and a construction industry with a relatively strong pipeline, and step-change in biosolids quantities from 2033 requiring disposal/recovery pathways, all contributing to an increase in the demand for waste services in general.

Balanced against:

- The recently released NZWS that targets reducing waste generation, which may change the amount and composition of waste requiring disposal, and
- An increasing priority on the reduction of emissions from waste (also a target of the NZWS and ERP), driving more resources into establishing new and more effective reuse and recycling facilities.
- Council's previous and ongoing efforts to educate both domestic and commercial users about the full range of diversion options available and the facilitation of easy access to these diversion services wherever possible.

Council's kerbside collection services will be impacted by the increasing numbers of high-density development such as Multi-Unit Dwellings.

The introduction of the kerbside rukenga kai / food scraps service will have a meaningful reduction in the tonnes and emissions from organic material in landfill from domestic waste.

Recycling services will continue to be vulnerable to changes in offshore markets, emphasising the importance of identifying NZ-based reuse solutions and reducing single-use items.

Council's advocacy to both central government in driving legislative change has been proven effective and further advocacy to both government and business will continue to be required to manage the demand for waste services and the continuation of the council's allocation of waste levy funding. These issues will be discussed further in relation to the options for meeting waste minimisation targets and demand for services in Chapter 8.

7 Future planning framework

7.1 Where do we want to be?

This section considers the council's vision, guiding principles, goals, objectives and targets for achieving waste reduction, and methods for meeting the forecast demand for services. Input to date from mana whenua, community and elected members has been used to draft the principles, goals and objectives in this chapter and further review and consultation will provide opportunities to strengthen these.

There is a role for council to develop a methodical process for looking at circular business models, and opportunities for halting waste generation, particularly activities at the top of the waste hierarchy for each priority area. This could include:

- Stocktaking existing circular business models and what is working in Auckland.
- Develop evidence-based methodologies for measuring reuse and waste prevention.
- Undertaking material flow analysis for packaging in Auckland to gain an understanding of the potential to set reduction and reuse targets.
- Increase waste prevention, reduction and reuse at events, to supplement the successful diversion activities already achieved.
- Consider and propose ideas to government and business for reducing waste generation for each product group or sector.

Waste reduction goals, objectives and targets for the Auckland region consider waste through five different lenses:

1. Auckland Council Group 'in-house' operational waste
2. waste streams managed by council e.g. domestic kerbside waste (refuse, recycling and food scraps)
3. waste streams not managed by council e.g. commercial and industrial waste
4. advocacy in legislation and regulations around products and waste production
5. overall waste to landfill.

The council continues to focus on aspects of direct control, such as domestic kerbside collection, while further developing its influence as regulator, role model and advocate for waste minimisation. The council continues to work with industry and business to influence reduction of the waste that sits under the control of others.

7.2 Vision

Te Rautaki Para – the NZ Waste Strategy (NZWS) 2023 is covered in more detail in Chapter 2.2. At a national level, the NZWS sets the following vision out to 2050:

> *"By 2050, New Zealand is a low-emissions, low-waste circular economy*
>
> *We cherish our inseparable connection with the natural environment and look after the planet's finite resources with care and responsibility."*

The strategy reflects broader economic and environmental government policy regarding how waste impacts our communities and well-being, and the need to target all levels of the waste hierarchy to ensure sustainable use of resources.

The 2018 WMMP (as below) continued a Zero Waste vision which had first been set in Council's 2012 WMMP. Previous WMMP visions were reflective of NZ's first Waste Strategy from 2002 which set the direction - 'Towards zero waste and a sustainable New Zealand'.

"Auckland aspires to be Zero Waste by 20240, taking care of people and the environment, and turning waste into resources."

While this is still largely reflective of council's current vision in terms of waste management, the next WMMP could include references to creating low emissions, circular economies to better align with the NZWS, the Auckland Plan 2050 and Te Tāruke-ā-Tāwhiri Auckland's Climate Plan. With this mind, the following vision, incorporating a circular economy, is recommended:

> Tāmaki Makaurau / Auckland aspires to be Zero Waste by 2040, working towards a circular economy, and taking care of people and the environment, turning waste into resources.

7.3 Guiding principles, goals and objectives

The guiding principles in this section reflect how council will carry out actions, and the important considerations that underlie council's decision-making. These principles guide the development of the WMMP goals and targets, objectives and proposed actions and ensure consideration is given to matters beyond waste minimisation and resource recovery, while council works towards the Zero Waste vision.

Advancing up the waste hierarchy

- Applying the internationally recognised waste hierarchy, including a focus as far up the hierarchy as possible in supporting a circular economy and the revitalisation of Te Taiao

Working together and changing hearts and minds

- Recognising that respectful, collaborative partnerships among communities, mana whenua, mataawaka, industry and other stakeholders must be fostered in addressing waste.
- Recognising that getting to zero-waste needs wide support and for everyone to play a part. This includes community and business buy-in together with central government action to level the playing field.
- Ensuring our waste and resource recovery services make it easier for people to do the right thing in maximising circulation of resources and minimising waste.

Strengthening Māori outcomes

- Recognising the importance of developing relationships with Māori to support Māori outcomes while acknowledging the unique roles that mana whenua and mataawaka play.
- Ensuring that waste management policy, projects and programmes, and their evaluation are underpinned by Maori priorities, values and principles of Te Ao Māori, that are informed by tikanga and mātauranga Māori, endorsed by mana whenua.
- Recognising the benefits of te ao Māori in waste management and minimisation including in telling the story of resource circularity

Taking an inter-generational and holistic approach

- Considering the short and long-term social, cultural, environmental and economic impacts of waste decisions, and taking advantage of opportunities for generating community benefits.
- Considering the end-of life uses and circularity of products while factoring in other environmental impacts such as lifecycle analysis of emissions where possible.
- Building resilience to changing local and global conditions including climate change
- Recognising the interdependence between the WMMP and other council policies, bylaws, plans and programmes such reducing greenhouse gas emissions.

Acting fairly and being responsive to need

- Shifting the responsibility and cost of waste to industries and consumers, and away from the environment, communities and future generations.
- Being adaptable and responsive to diverse groups in the community, especially to those in greatest need.
- Exploring and supporting local and regional solutions to waste issues and resource recovery opportunities.
- Making it possible for households to reduce the cost of their waste disposal.

Making the best use of every dollar spent, and being affordable

- Aiming to deliver the most cost effective and efficient solutions to meet the requirements of relevant legislation while maximising waste diversion and minimising costs to ratepayers.
- Promoting innovation and considering new partnership and funding models to solve intractable waste problems.

Checking progress and being transparent and adaptable

- Collecting accurate data to enable sound decision-making.
- Sharing the stories of progress towards zero waste to build and amplify what's working both at the regional and local level.
- Monitoring and evaluating waste initiatives to measure progress and allow for continuous improvement.
- Ensuring the council focuses on its own zero-waste journey, and that we actively provide information to the public about performance against targets and waste outcomes.

Goals and objectives

Based on Auckland's current situation and developments since 2018, the following goals and objectives summarise what Council aims to achieve. In working towards these outcomes, the goals have been tested against the guiding principles in the previous section.

Goal: Maximise circularity of resources and products in accordance with the waste hierarchy

Objectives

1. Organisations and individuals take responsibility for avoiding waste being generated and keeping products and materials in use as long as possible. This encompasses:
    - a focus on designing out waste, including through planning and regulatory tools, such as site waste management plans, central government product bans, or mandatory product stewardship schemes
    - providing consumers with options for re-use, repair and re-purposing existing products within the region
    - Building awareness and support for zero waste and the circular economy.
2. Organic waste is diverted from landfill
    - food and green waste is reduced or beneficially used, for example through feeding others, composting, worm farms, anaerobic digestion, soil amendments, restoring land.
    - organic textiles and other organic materials are diverted from landfill for beneficial reuse and recovery.
    - greenhouse gas emissions are reduced.
3. We have a well-supported, accessible network of infrastructure across the region to support resource recovery and deliver community and Māori outcomes.
4. We have robust data and information to target our efforts to minimise waste while protecting the environment, and safeguarding health and wellbeing.
    - We have a better understanding of embodied carbon of products to support better decision-making.

Goal: Minimise harm - address the impacts of waste on the environment and communities including reducing harmful waste, litter and illegal dumping

Objectives

1. Our total waste volumes are reduced sufficiently so that the need for final disposal is minimised.
2. People treasure and respect the environment with less litter and dumping including into waterways and the sea.
3. In times of disaster, all sectors work together to keep communities safe from contaminated waste while supporting needs for replacement goods and diverting waste where possible.
4. Harmful waste is avoided, and residual waste is managed and treated to prevent harm to health and wellbeing and to the environment.

7.4 Proposed targets

7.4.1 Description of proposed targets

Targets established within this waste assessment to guide the proposed options (Chapter 8) are:

In-house	• Reduce office waste by 50 per cent from 0.14kg per visit to 0.07kg by 2030 (from 2022 baseline data). • Work across the council to collate data for significant operational waste streams by 2025, establish baselines by 2026 and set targets for the following years to 2030.
Domestic kerbside refuse	• Reduce domestic kerbside refuse from a 2022 baseline of 141 kg to 120 kg per capita per by 2028 (a reduction of 15 per cent).
	• Further reduce domestic kerbside refuse from 120 kg to 100 kg per capita (a 17 per cent reduction) by 2030.
Overall reported waste to Class 1 landfill	• Reduce total council- and private-sector-influenced reported waste to Class 1 landfill by 30 per cent from a 2022 baseline of 873kg per capita per year to 611kg per year, by 2030.
	• Reduce the tonnage of organics (paper, garden, food) by 100 per cent for food and garden waste, and 50 per cent for paper by 2030, to achieve emissions reductions targets (biogenic methane) from landfill as outlined in the New Zealand Emissions Reduction Plan.

7.4.2 In-house office waste target

While much waste in the council office buildings is diverted through recycling and food scrap collections, the 2019 office waste audit revealed that up to 70 per cent of the items discarded in the refuse bins still has the potential to be diverted.

Avoidance of waste generation through behaviour change, new systems implementation and ongoing staff training, we aim to reduce at least 70 per cent of this divertible material, resulting in a total reduction of 50 per cent refuse.

For example, phasing out single use items such as takeaway packaging (coffee cups, lunch containers), exploring procuring items for kitchenettes such as milk, coffee, tea in reuse systems.

7.4.2b Operational waste target

Further work to better understand and collate cohesive data on the Auckland Council Group's operational wastes is needed. There are examples of reporting systems within the council, but these are not consistent enough to be aggregated to provide meaningful baselines or measure progress. Work to address this has been initiated in 2023. This will focus first on activities with significant waste streams and involves establishing a system for reporting across projects, including excavation and construction and demolition. Once those reporting systems have been created and rolled out, baseline data can be collected to establish baselines by 2026; allowing for targets to be set for subsequent years.

7.4.3 Domestic kerbside refuse target

The Ministry for the Environment has indicated the following targets will apply for territorial authorities to divert household waste placed at kerbside:

- 30 per cent by 2026
- 40 per cent by 2028
- 50 per cent by 2030

The council currently diverts 27 per cent of domestic kerbside waste to recycling. Reaching 40 per cent diversion by 2028 will result in a forecasted 120kg per capita, and 50 per cent diversion of forecasted 2030 refuse will result in 100kg per capita.

7.4.4 Overall waste to landfill target

While the council can directly influence the waste and diversion of material generated by households with waste minimisation interventions, the majority of waste being generated by the commercial sector is much harder to influence. In the interim, between this waste assessment and the last, increases to the landfill levy have been introduced.

The levy increase is probably the single most significant change to waste behaviour that we have seen in the last decade. However, when controlling for population growth, Auckland Council has not seen the levy increase influence waste tonnages to landfill; total waste to landfill remains stagnant at 873 kg per capita/year.

For this reason, we have reset the target to a 2022 baseline and left the tonnage as it was, to be reduced by 30 per cent by 2030, in line with the NZWS, which is a shorter timeframe to achieve the same target outcome.

7.4.5 Emissions from landfill target

Waste has a role to play in meeting New Zealand's 2030 and 2050 targets for biogenic methane. In 2019, waste was responsible for 4 per cent of our total gross emissions. Of these emissions, 94 per cent were biogenic methane generated by the decomposition of organic materials at landfill.

According to the ERP, to meet the national emissions budget to 2035, 100 per cent of all food waste should be diverted from landfill (40 per cent to composting (20 per cent windrow and 20 per cent in-vessel composting) 60 per cent to anaerobic digestion, and 100 per cent of green waste diverted to composting.

While the ERP is silent on the contribution of paper breakdown to biogenic landfill emissions, significant volumes of paper and cardboard are sent to landfill from the Auckland region. Around 114,000 tonnes of paper and card is responsible for close to one-third or 77,765 tonnes of C02-e each year.

8 Options assessment

This section reviews the practicable options available to meet the forecast demand for waste management and minimisation activities in the Auckland region, and support the move towards a low emissions, circular economy.

In developing these options, consideration has been given to the key waste streams for diversion, future demand issues, the preliminary waste minimisation targets outlined in Chapter 7 and key challenges and opportunities faced within the Auckland waste disposal and diversion environments.

This chapter discusses:

- council methods to deliver waste minimisation and a circular economy
- focus on specific products, sectors and waste streams to be targeted
- options to meet the forecast demands of the district with an assessment of the suitability of each option
- scenarios for how packages of options might be implemented.

8.1 Methods for council to drive a circular economy

Local Government has a vital role to play in creating the conditions for a circular economy transition by identifying practical, scalable opportunities for the circular economy to thrive.

With the right frameworks in place, Auckland as New Zealand's economic powerhouse can take the lead on transitioning to a circular economy that is fairer, with sustainable production and consumption levels that will ultimately reduce waste.

Cities are pivotal in creating opportunities for targeted circular economy investment and incentives. Auckland Council can do this on a number of fronts - as a major procurer of products and services, influencing government policy, and by harnessing social capital and creating networks where the thinking takes place.

Getting there involves joining up the currently disjointed activities across sectors and regions, as well as internally within Auckland Council. A starting point is understanding of how materials circulate through the economy which is what Auckland Council has initiated in this waste assessment through the reuse systems assessment, food map and textile consumption and waste research.

Different departments of Council and its CCOs can collaborate and coordinate effort on circular economy opportunities as the circular economy has implications for a variety of ways council works.

In addition to waste solutions, other parts of Council are already operating or supporting circular business models, such as running libraries (sharing economy), supporting the development of car sharing schemes (product-as-a-service), and procuring certain services that follow reuse/repair principles.

Training and information sharing functions will connect people on the environmental and social objectives of the region.

Modelling a decoupling of resource use from economic growth (GDP), the Sustainable Business Network, Tātaki Auckland Unlimited with economic analysis by Sapere Research Group found that for Auckland as an

economic region, working differently and identifying circular business models for the food, transport and built environment sectors would actually build resilience into the economy and trigger a new era of business innovation that would radically reduce the costs of our economic activity and material inputs.

Resilience is gained by reducing the exposure to price shocks and supply chain interruptions, and access to virgin materials from offshore, which has been experienced numerous times in the past decade, for example through the COVID-19 pandemic.

Funding the transition, setting the rules, and demonstrating how to think and operate in systems is where the council brings value.

Auckland Council can recognise and communicate the critical role of circular business models, particularly those that already exist and are successfully embedded in our economy. These include sharing economy, product-as-a-service, and product life extension approaches, for example tool libraries, car-share schemes, laundromats, reusable packaging and refilleries, second-hand marketplaces, repair and maintenance activities. These will all need to increase in prevalence for circularity to grow and waste generation targets to be met.

The benefits have been modelled to be in the order of $6.3-$8.8 billion contribution to GDP by 2030, with a potential carbon reduction of 2,700 kilotonnes of CO2-e.

“Transitioning Auckland to a circular economy [creates] an economy which seeks to de-couple resource use from economic growth, keep resources in use for as long as possible, extract the maximum value from them, then recover and regenerate products and materials at the end of their use”[39].

The way we use resources is currently very wasteful, things are often discarded after one use. Circular economy is a complete systems shift, not just tweaking how products are made. Fundamentally, a slowing of natural resource extraction is required. We cannot achieve this without changing the way we live, work and get around. Businesses need to transition from linear business models that generate profit from repeat purchasing of products, which incentivises produce over-duplication and short-lived products, both of which drive natural resource extraction.

In contrast, circular business models see ongoing profit generated from the continued circulation of products and resources (such as reuse, repair, maintenance, recycling) and through access to products rather than ownership (eg a sharing and service-based economy) all of which protect and conserve resources.

Auckland as an economic region also holds significant opportunity, for example more than half of the 10,000 tonnes of clothing manufactured in New Zealand is made right here in Auckland.

Aucklanders consume around 25,000 tonnes of clothing per annum, meaning with some high-level thinking, there are very real opportunities to close the loop on clothing production and wasteful consumption, and address some of the environmental damage done to our planet by the apparel industry.

Another example is the development of industrial and manufacturing clusters, which is demonstrated through commercialisation of bioeconomy technology at EcoGas, the food scraps recovery infrastructure, where Auckland Council sends its food scraps. The EcoGas anaerobic digestor is located within a farming

[39] https://sustainable.org.nz/media/odjf0zit/sbn_circulareconomyopportunity_forauckland.pdf

region which means the farming industry can use the heat and fertiliser outputs produced as a by-product of the anaerobic digestion process, displacing the need for transport and/or import.

Equally, Auckland is a huge consumer of building and construction materials through the high rates of housing construction to accommodate the growing population.

Key policy and strategy tools that will support a just transition to a less wasteful, circular economy include:

- Right to repair and product durability and other legislation creating resource efficiency performance and information requirements for products (e.g. relating to durability, reusability, modularity, repairability, material/resource usage and substances of concern).

- Product stewardship and Extended Producer Responsibility schemes (the latter has been proposed by Government to replace product stewardship in the new waste legislation) that are designed to fully finance the cost of recovering and recirculating products and resources and are working towards outcomes higher up the waste hierarchy.

- Binding, measurable and timebound targets that separately address different levels of the waste hierarchy, such as consumption reduction and reuse targets, alongside recycling targets. Targets may be set for particular materials, products or sectors, and apply to a variety of different entities and organisations, as well as local and central government. Reuse (rather than recycling) targets.

- Economic instruments that can incentivise and disincentivise certain materials, products and business models, such as levies, deposit/return systems, subsidies and tax rebates.

- Continuing with a programme of phase-outs for problematic products and activities, alongside implementing mandates and obligations for specified organisations to provide certain products or services to support source reduction and recycling outcomes.

- Measuring baselines and tracking of materials through the economy through improved digital data and reporting requirements

- Development of consistent, evidence-based methodologies for measuring the impact of waste prevention and reuse activities so that Councils and central government can report on this alongside waste and recycling data.

- Prioritising allocations of contestable waste minimisation funding according to the waste hierarchy to enable niche top of the waste hierarchy circular business models and initiatives to scale and be competitive and accessible for more New Zealanders.

- Government procurement policies that support circular business models and circular products, as well as social procurement to support community-enterprises.

Most of these tools need to be implemented via legislation, but the Waste Minimisation Act is insufficient to address all of these issues. The Government's proposed update to waste legislation as detailed in the five Cabinet Papers will enable some of the tools outlined above. However, some, such as new target-setting powers or the ability to set economic incentives like levies, are not currently on the table. The opportunities offered by procurement are currently under-explored.

New Zealand also needs a more holistic approach to policy and legislative implementation, coordinated across government departments that is fit for purpose to carry us towards our 2050 goals. For example,

enabling right to repair and product durability legislation for electronic goods would mean changes to the Copyright Act 1994, the Consumer Guarantees Act 1993 (both administered by the Ministry for Business Innovation and Employment), and these would need to be integrated with product stewardship (or EPR) provisions in the new waste legislation currently being drafted.

MBIE is driving New Zealand's Circular Economy Strategy and the Emissions Reduction Plan (ERP), and has procured research into evidence about the impacts, barriers and enablers for a circular economy and bioeconomy in Aotearoa by 2050. The strategy is proposed to be complete in climate budget period one (2022-25).

Recommendations in the ERP's circular economy and bioeconomy chapters are:

- Recommendation 14: 'Increase the circularity of the economy' by developing and delivering a circular economy strategy to be created in partnership with iwi/Māori.
- Recommendation 15: 'Develop a thriving, climate-resilient bioeconomy that delivers emissions reductions' by developing and delivering a bioeconomy strategy created in partnership with iwi/Māori.

8.1.1 Influencing behaviour change

Engaging with stakeholders and creating desired behaviour change underpins our waste activities. The council is using a range of engagement, education, community development and other behaviour change approaches to work with communities and Māori to drive a reduction in waste generation, embed thinking about circular economy, and reduce waste to landfill.

The objective is to encourage our communities and businesses to re-think the material they produce and consume, taking a life-cycle perspective that involves looking upstream and downstream, viewing products as resources that can be used again and again, and avoiding the need to extract more virgin materials from Papatūānuku and the environmental impacts of waste on the whenua and climate (circular economy principles).

These actions include:

- Recognising it is businesses who decide which products get put onto the market, and so a proportion of our effort must be directed towards business.
- Partnering with and resourcing community organisations to work with their local communities to build understanding of waste changes and increase knowledge and skills to minimise their waste.
- Partnering with Ngāti Whātua Ōrakei to implement Para Kore ki Tāmaki.
- Region-wide programmes and networks to build and share knowledge and skills in waste minimisation.
- A Waste Minimisation and Innovation Fund that provides seed funding for communities and businesses to develop new and innovative ways of reducing waste, with funds allocated in accordance with the council's priorities.
- A dedicated team of waste advisors who engage with individuals and groups to help promote waste diversion services and identify and help overcome barriers to their use.
- Supporting delivery of national campaigns at a local level.

8.1.2 Providing services, guidance and infrastructure

The most effective and quantifiable method for changing behaviour and minimising waste to landfill is through direct action by the council. These methods generally involve 'doing it yourself' by providing services and supporting infrastructure that helps divert waste away from disposal.

Auckland Council provides waste services that are predominantly focused on the residential sector. These include:

- kerbside collection and inorganic collection services for residents
- operation of a network of community recycling centres as part of the development of Auckland Council and Community Resource Recovery Network (ACCRRN)
- operation of limited waste infrastructure, including the Waitākere Refuse and Transfer Station, the Onehunga Materials Recovery Facility (MRF) and part-ownership of Whitford Landfill. These facilities play a role in supporting the delivery of Council's residential services.

These services are underpinned by the community engagement activities (listed in the previous section) which ensure that residents and businesses know what services are available and how to use them effectively.

However, enhancing our involvement in promoting understanding and adoption of circular and regenerative economy principles may have greater payback in terms of reducing waste generation over the longer term and there are a range of ways that Auckland Council could support this societal shift.

As discussed earlier in the waste assessment, this could involve research to pinpoint production and consumption patterns that will offer the greatest wins, as well as collaborating with other parts of council more directly connected to business activities (eg. Tātaki Auckland Unlimited) to support greater circularity of resources.

Council can use its infrastructure networks such as the RRN, showcasing circular initiatives that promote the understanding of avoidance, reusing, repairing and composting within the community.

The council's early adoption of new services in turn drives waste minimisation in the wider community. To support the delivery of the council's services, waste infrastructure is also developed by the private sector. Typically, this infrastructure is made available by the private operator to other councils and private waste generators to support their waste management and minimisation needs and is built to accommodate this additional volume. As examples, both the Ecogas digester and the Onehunga MRF accept material from commercial customers and other councils.

By investigating the use of technology in the way the council delivers its services, emerging technologies that are beneficial in helping reach the waste to landfill targets can be tested e.g. advancements in sorting technology and systems for rewarding/incentivising consumer and business behaviour. Regarding

technologies that recover energy from wastes, the Ministry for the Environment recommends four principles which provide a useful framework to evaluate waste-to-energy proposals as follows, and these [40]:

- Principle 1: The proposal should support the goal of moving New Zealand steadily up the waste hierarchy towards a circular approach to managing resources.
- Principle 2: The environmental impacts must be well managed, especially the greenhouse gas emissions.
- Principle 3: The proposal must be commercially viable over the long term.
- Principle 4: There should be a strong level of support from the community and Treaty partners.

The degree to which a waste to energy (WtE) operation is successful depends on the local waste and energy context – in particular, the presence of supportive partners, stakeholders, existing infrastructure/services, institutions, and policies. A report investigating the implications of WtE technologies in Auckland is provided in Appendix C. Some of the key points are summarised below.

Considering the local context in Auckland, large scale incineration of mixed wastes is not a recommended approach for waste minimisation and management for Tāmaki Makaurau. Any proposal in this regard would need to undergo a thorough feasibility study to determine overall viability.

Despite improvements in air quality emissions controls over the years, the establishment of a conventional incineration plant in Tāmaki Makaurau is not expected to receive strong political or community support. Alternative thermal technologies, such as pyrolysis or gasification, may be favoured over combustion, however the level of support is dependent on the types of feedstocks processed and key outputs, along with a thorough evaluation against the four key principles on a case-by-case basis.

The capture of landfill gas is deemed a necessary requirement and should receive ongoing support from the council as it provides an important contribution to reducing landfill greenhouse gas emissions. Energy generated from captured gas serves as a secondary priority, with stronger emphasis instead placed on actively seeking methods to reduce and divert organics materials from landfills to avoid the generation of bio-genic landfill gas.

The council advocates for the use of anaerobic digestion (AD) technology, as a specific WtE technology designed to manage specific organic wastes (alongside other non-WtE organic waste processing options that return nutrient value to soils and animals). AD provides a more cost-effective solution compared to thermal processing of wastes with fewer environmental/social risks, and according to the NZWS is given a preference on the waste hierarchy over other WtE processes.

Currently, the waste levy does not apply to facilities that incinerate mixed wastes. In order to create a level playing field and not encourage waste producers to choose incineration over other diversion options further up the waste reduction hierarchy, Auckland Council supports a change to national legislation.

[40] Ministry for the Environment., 2020. A waste to energy guide for New Zealand - Factsheet. Published by the Ministry for the Environment, August 2020. INFO 964. *https://environment.govt.nz/assets/Publications/Files/waste-to-energy-guide-for-new-zealand.pdf*

8.1.3 Supporting action by others

With a focus on residential services, Auckland Council only has direct control of a small amount of Auckland's waste. The remainder is controlled by the private waste and diversion sectors, including private companies and social enterprises. Council's ability to influence behaviour is critical to reducing the privately controlled waste generated in the region.

Council supports action by others to minimise waste by:

- Supporting businesses/enterprises with circular business models to increase their market share by procuring their products instead of products that might be more linear (e.g. single-use packaged, or not repairable/serviceable, shareable)
- Promoting good industry practice through sector-specific forums, publishing case studies (local, national and international) and guidance documents
- Supporting demonstration projects through waste minimisation grants
- Connecting waste producers and recyclers through facilitation, include web-based forums
- Supporting the use of Council's community recycling centres for innovative circular economy initiatives
- Requiring Council's own demolition and development projects to meet minimum diversion targets and use recycled materials in construction
- Advocating for national level changes, such as right-to-repair, reusable systems, duty-of-care responsibilities, continued levy increases and extended producer responsibility. Waste regulations imposed at a national level means changes apply to all waste generators, regardless of location. Once introduced, Council can support their implementation at a local level.

For example, Council's efforts to engage with event organisers has seen a noticeable change in packaging at events in recent years. While many event organisers have made initial transitions to replacing polystyrene and plastic single use packaging with compostable serveware, Auckland Council now needs to take this education further, to promote reuse systems within the event space.

It is important to note MfE's position on compostable products and that businesses and the general public should take a cautious approach when considering using compostable products due to consumer confusion and the need for these products to be composted in a suitable facility or they will not break down[41].

The packaging guidelines in the WMMP encourages the event managers to work with vendors which have moved away from the single use plastics items. Government legislation has helped with items like plastic straws which were still being used until recently.

8.1.4 Regulating undesirable behaviours

As a regulator, the council has some legal mechanisms it can use to enforce behaviours, promote the circular use of resources, and prevent inappropriate waste management such as illegal dumping. These mechanisms include bylaws, and district and regional plan rules. For certain waste minimisation actions however, the use of national standards and other national regulations may be more effective tools, given flows of materials and wastes go beyond local boundaries (e.g. recent phase-outs of hard-to-recycle

[41] https://environment.govt.nz/assets/publications/compostables-packaging-position-statement.pdf

plastics). Regardless if regional or national, regulatory tools can be challenging to develop, costly to administer and/or difficult to enforce.

Some councils have used local bylaws to prohibit the disposal of certain materials in either their kerbside refuse collection or from landfills or cleanfills. Auckland Council and other councils have imposed waste licensing systems (in the absence of a national waste tracking system) to help manage and identify those operators who are generating, transporting and disposing of various waste materials.

In Auckland, our 2019 Waste Bylaw include bans on certain materials (such as garden waste) being placed in kerbside refuse bins, although it is not enforced widely, and information about its effectiveness has not been assessed. It would be difficult to enforce bylaws which impose regulatory disposal bans of certain materials (e.g. food or garden waste) because the council is not generally in control of the transfer stations, resource recovery centres or landfills. Disposal bans are also difficult to enforce if there are inadequate collection services (or other alternatives to disposal) for the banned material.

Cabinet papers released by the Ministry for the Environment in 2023 indicate various regulatory and enforcement tools which may form part of the reform of the Waste Minimisation Act and the Litter Act 1979. These include duty-of-care responsibilities and stronger enforcement powers. Following the recent reform of resource management laws, there are also likely opportunities for council to develop enabling methods within its unitary plan to support more circular uses of materials such as soils and biosolids, as well as better preventing harm from poor waste management practices. It is recommended that these types of regulatory approaches are used to support other initiatives that seek similar outcomes, and not be relied upon in themselves to achieve significant waste minimisation objectives.

8.2 Focus on specific products, sectors and wastes

Based on the quantities and composition of waste and existing resource recovery facilities and services and future demand analysis presented in this assessment, Council has identified the following eight products/sectors and wastes where waste minimisation action on be focused: .

- Construction and demolition, including soils
- Food production, manufacture, service and consumption
- Packaging (household consumables, kerbside recycling, commercial wastes and the CRS)
- Six product groups declared as national “priority products”
- Nappies and sanitary products
- Textiles (fashion, uniforms, homewares including carpets and upholstery)
- Disaster response and recovery
- In-house and operational waste (Council and CCOs), including biosolids management

These reflect the priority waste streams that were first identified in council’s WMMP which was produced in 2012 and expanded to target other products, sectors and wastes. The main reasons these areas have been prioritised over others is:

- they represent a high proportion of waste sent to landfill
- they represent a high proportion of greenhouse gas emissions from waste
- their volume is increasing, and current resource recovery options are limited
- resource recovery options exist for these materials, but the systems are lacking resilience

- they are difficult to recycle or have the potential to cause harm to people or the environment
- there is a need for Council to show leadership with the management of its own waste.

Why these are priority waste streams and the broader issues and challenges associated with addressing them are discussed below to help guide potential options and future planning covered later in this chapter.

8.2.1 Construction and demolition waste, including soils

Construction and demolition, as a sector, is the highest contributor of waste to Class 1 landfills in the Auckland Region. C&D waste to Class 1 landfills includes concrete, rubble, plasterboard, cardboard, plastic (pipe and wrap), window glass, ferrous and non-ferrous metals as well as contaminated soil, representing around 35 per cent of waste to these disposal facilities. Cardboard and timber are significant contributors to greenhouse gas emissions from landfill. Soils, uncontaminated or lightly contaminated, are disposed in Class 3-4 landfills and also predominantly come from the C&D sector.

The Climate Change Commission's first advice report in 2021 recognised buildings as one area where embodied consumption-based emissions could be significantly reduced. Creating opportunities to understand the embodied emissions of buildings will add support to zero waste initiatives such as whole house deconstruction and building refurbishment over replacement.

In summary the key issues are:

- A considerable amount of waste is integrated into building projects from the design, material selection, quantity surveying and specifications.
- Despite demonstration projects showing high potential diversion from landfill, widespread adoption has not occurred.
- Alternatives to landfill disposal for contaminated soils are seen as risky, introducing project uncertainty from both a cost and programme perspective.
- There is a willingness to change within the sector, provided the reuse and diversion opportunities are cost- and time-effective and reverse logistics are in place.

Actual tonnages of C&D waste are subject to considerable uncertainty, but C&D waste is estimated to make up around 35 per cent of all waste going to landfill, with additional and potentially significant quantities going to cleanfill and managed fill sites (Class 2-5 landfills). As a further addition, an unknown volume of waste is produced from the manufacture of building products which is classified as commercial waste.

Since the 2017 Waste Assessment, we have continued to see an unprecedented growth in building and construction. The drive to meet demand for new private and socially provided residential dwellings has been maintained. At the same time, infrastructure projects have also progressed at pace with work on the City Rail Link, Eastern Busway and Central Interceptor being notable examples.

Council has been active in partnering with tertiary institutions (AUT, Unitec and Massey University) to undertake research into C&D waste. This has improved our knowledge of plastics in C&D and resulted in innovative tools such as the Massey University Construction Waste Calculator.

Detailed studies undertaken for the Waste Assessment have revealed that build waste for residential buildings sits at around 25kg per square metre, slightly lower than previous studies suggested. Timber, plasterboard, and cladding products make up the most significant materials wasted. However, the

investigations indicate that the removal of soil, aggregates, and concrete from residential building sites vastly out-weigh all building materials combined[42].

The same study also included a desktop study of residential construction in different parts of the world and concluded that overall in higher-income countries which are members of the OECD, C&D waste was the largest waste stream, while C&D is the third largest waste stream on a global scale. This indicates that, as income increases in a country, quantities of C&D waste also increase. Worldwide, it is estimated that between 16 and 60 per cent of landfill waste is generated by the C&D sector[43]. In countries with building systems similar to New Zealand (NZ), the landfill rate is 33 per cent (USA), 35 per cent (Canada), 50 per cent (UK) and 20-30 per cent (Australia)[44].

Further attention is required to integrate waste minimisation in design. C&D waste starts the moment a developer initiates a project, a point emphasised by the *Parliamentary Environment Briefing on reducing construction and demolition waste going to landfill* report. This is compounded by each stage of the design process where there is typically insufficient consideration of waste in the architectural, design, specifying and quantity surveying processes. Some building products, including plastics and timber, are particularly problematic. Inadequate site practices by some contractors also leads to local pollution issues, an area of concern to some Local Boards in Auckland. Materials such as expanded polystyrene are often poorly handled on sites with the result that scrap and 'snow' from this product frequently enters local waterways and neighbouring properties. Hazardous materials such as glue and sealants are commonly used and asbestos containing materials are still prevalent in many legacy buildings. Timber is a significant component of the overall waste to landfill, with most of it originating from the construction and demolition industry. There are indications that there is a market for the reuse of both treated and untreated timber. Demand for scrap timber to fuel cement kilns is strong, with use in this market expanding in recent years owing to the availability of several large-scale resource recovery plants.

For some building materials, such as scrap metal and PVC, diversion markets are well developed, with "take back" and product stewardship schemes rapidly emerging for others. Active financial incentives to recover material, similar to those that exist for scrap metal, along with practical reverse logistics are vital to encourage utilisation of these schemes for those materials that are typically directed to landfill.

A movement away from demolition to deconstruction of buildings is gaining momentum. Auckland Council, Kāinga Ora, Eastern Busway and some developers have adopted deconstruction and strip out methods that maintains the value of materials. This allows the supply of salvage material to grow, integrates Community Recycling Centres and increasing the potential for circular economies.

There is widespread industry interest in C&D waste, with eagerness to upskill, learn about and resource themselves to reduce C&D waste, particularly at a time when the industry is focusing on improving productivity. Initiatives such as www.buildingoutwaste.co.nz, the Site Safe Environmental Site Management Course and action being undertaken by a range of building companies, both large and small, are greatly contributing to this knowledge.

[42] "Residential Construction Waste Targets" by Seadon Consulting on behalf of Council, March 2023
[43] "Factors influencing construction waste generation in building construction: Thailand's perspective" Luangcharoenrat et al., 2019
[44] "Identification of root causes of construction and demolition (C&D) waste: the case of Turkey" Polat et al., 2017

A 2020 study by Colmar Brunton[45] identified the key barriers and motivations to behaviour change in the C&D industry as:

- insufficient knowledge about the availability of diversion opportunities
- perception that recovering materials will add cost to the overall project
- between designers, builders and project owners, there is a lack of ownership of the waste problem (the waste belongs to someone else)
- the impact on time, money and effort must be fully understood and demonstrated on projects industry can relate to.

As a large participant in this industry, the Auckland Council Group has opportunities to problem solve, role-model, facilitate, and advocate for greater behaviour change from other industry players, that will reduce C&D waste to landfill.

Further information regarding C&D waste within the Auckland region is included in Appendix D.

Soils

Soils are also a large component of the waste stream that is created by construction activity – particularly from civil works that are both vertical (buildings) and horizontal (roading, utilities). Detailed information on soil movement is difficult to obtain with few cleanfills having weighbridges. Fill volumes are not consistently captured in consent information. A large volume of Class 1 landfill space is taken up with contaminated soils, with little onsite treatment. Use of Class 2-5 landfills for soil disposal as an alternative to Class 1 is increasing, likely driven by changes to the waste levy. Contaminated soils generally come from remediation and development of sites used for HAIL[46] activities. Given the relatively low cost of landfilling, there can often be little incentive to seek alternative options to reduce this waste stream.

Despite the cost of driving soil large distances, lack of regulation and a fragmented monitoring framework has led to hundreds of thousands of tonnes of good quality soils, including topsoil 'disappearing' into disposal sites at the same rate as poor quality contaminated soils that are required to be disposed of at a facility authorised to receive them.

The quality of data is expected to improve with changes to the administration of the waste disposal levy, which required operators of Class 3 to 5landfills to begin reporting data to the MfE on tonnages disposed of from 1 January 2023.

Soil disposed of to a cleanfill cannot be recovered and is lost from beneficial reuse after that point.

Identifying solutions to the issue has drawn some coordinated effort from Manaaki Whenua – Landcare Research, WasteMINZ and the New Zealand Geotechnical Society who have been working on a practice note to articulate the drivers for soil movement, environmental problems that come about as a result, financial costs associated with different pathways of soil disposal, alternatives and benefits to practitioners of sustainable soil management.

[45] "Behaviour change for sustainability – Making waste more sustainable in the C&D sector" by Colmar Brunton on behalf of Council, 2020

[46] https://www.aucklandcouncil.govt.nz/building-and-consents/resource-consents/types-resource-consents/earthworks/Pages/contaminated-land.aspx

Most of the displaced soil comes from land development, with a much smaller source being land slips and other natural events.

Source activities include infrastructure (roads and utilities), residential sub-division on ex-production land, residential development on infill sites, and industrial/commercial development on greenfield and urban sites.

Soils at these sites can be a mix of uncontaminated (at or below background contamination levels), lightly contaminated (above background levels or below the applicable guideline limits) or heavily contaminated with material such as asbestos and lead.

While common sense would suggest that only those soils that are heavily contaminated or creating an ecological or human health risk should be disposed of to landfill, recent practice has seen extensive site clearances which sees clean or virgin soils as well as contaminated soil being disposed of to landfill at increasingly rapid rates.

Developers of both infill and greenfield sites may excavate a whole site down to the clay, removing the top 30 centimetres or more of soil in order to remove and discard potential contamination and create a blank slate for the build.

Major transport and water infrastructure projects are significant contributors to soil/spoil disposition. The CRL excavations have resulted in over 1,600,000 tonnes of spoil.

Contemporary housing developments and building styles demand houses where the entry is at grade, necessitating extensive excavation and removal of soil. This has also resulted in a burgeoning excavation industry, encouraging more soil digging and disposal at low cost.

This is a tragedy for the environment and the climate. Soil loss can increase the risks of erosion, and as a strategy for fighting climate change, soils have potential. Agricultural soils, in particular, could sequester a billion additional tonnes of carbon each year[47]. Changing practices in this sector could be developed following the principles of a regenerative, circular economy, with a strong emphasis on regeneration and the bioeconomy.

The drivers of this poor practice are understood to be:

- The low cost of landfill/cleanfill
- Lack of willingness to test and assess soil, due to cost or time delays.
- Misperceptions from the public or industry that land previously used for agriculture or has had buildings on it is contaminated.
- Lack of regulatory barriers and incentives to drive the reuse of soil.
- Lack of space on site to retain the soil due to intensity of development.
- Perception that the future value of the site would be negatively impacted if soils were retained.
- Liberal use of design methods that result in large volumes of soil excavation.
- A highly active excavator services market that has made designs involving removing large amounts of spoil cheap to deploy.

In contrast, mātauranga Māori can bring a completely different set of values to displaced soil management. Māori have more than 100 words to describe soil, and in the Te Ao Māori world view, soil has a whakapapa

[47] https://www.frontiersin.org/articles/10.3389/fclim.2019.00008/full

or connection to a place, and when possible, should stay where it descended from. Like Mauri for water, the mixing of soils from areas with different whakapapa, or contaminated soils being mixed with uncontaminated soils has caused some cultural concerns[48].

Māori could play a key role in shaping a future framework that reduces some of the poor cultural practices we are seeing with soil management.

A further report on the disposal of soils to different classes of landfill is included in Appendix E.

[48] Harmsworth, G. Oneone Ora, Tangata Ora: Soils and Māori Health and Wellbeing.

Case Study 2: Piha Deconstruction 2020

Rain events in 2018 created flooding issues for properties along Glenesk Road in Piha with two properties being identified as unsafe should another flooding event occur. Council purchased these properties to effectively manage the risk associated with their future use.

In the past, the methodology for removing such houses would have been via demolition practices. However, the houses presented an opportunity to implement a more sustainable approach to removal. A careful deconstruction method was implemented to remove the houses, with a concerted effort being put towards the recovery and reuse of materials where possible and practicable.

The intention was for as much of the deconstructed materials as possible to be retained for reuse within the Piha community. An expressions of interest process was established so interested groups could indicate materials they would like to reuse with a schedule of materials that were expected to be salvaged from the building provided to interested organisations and also local residents.

The contractor, TROW Group played a central role in connecting with the community and safely providing recovered materials.

The deconstruction of the two houses resulted in 50 tonnes of material being recovered -redirecting the materials from entering the landfill. Regrettably, some plumbing fittings and floorboards were stolen from the site.

Materials were distributed to seven community and art destinations and two residents. This included a permaculture garden, a local environmental group, Piha First Responders, two artists, McLaren Park and Henderson South Community Trust, the Re-creators upcycling collective.

Only 3.8 tonnes of rubbish were sent to the landfills due to flooding damage. In total, 7.9 tonnes of materials were distributed to community groups and residents. The remaining materials were taken to the

TROW yard in Swanson with some valuable building items such as trusses and timber already on their way in containers to Tonga to aid in the rebuild of cyclone prone homes.

ITEM	DESCRIPTION	PICTURE	QTY	UOM	CONDITION
1	WINDOW 01 2440LX1230H WITH BLIND		1	ITEM	GOOD
2	WINDOW 02 2440LX1230H WITH BLIND		1	ITEM	GOOD
3	WINDOW 03 1200LX1600H WITH BLIND		1	ITEM	GOOD
4	WINDOW 04 440LX1040H WITH BLIND		1	ITEM	GOOD
5	ENTRANCE DOOR 1840HX2850L		1	ITEM	GOOD

Examples of how some of the remaining material has been reused:

Polystyrene: Sent to Divert NZ. A ‘Landfill Avoidance Specialist’ that compacts the polystyrene and sends it overseas to be converted into plastics.

Metal: Sent to various processing facilities to be recycled back into products.

Concrete: Crushed to make various General All Passing (Gap) products.

8.2.2 Food production and consumption

Food waste remains the largest component of kerbside residential waste to landfill, 41 per cent by weight. It is also a large component of total waste to landfill, 10 per cent by weight, contributing 26 per cent of the biogenic methane emissions from waste.

In summary the key issues are:

- Some food waste remaining in kerbside rubbish bins, despite food scraps collection services being rolled out across Auckland (noting the kerbside food scraps roll-out in progress).
- There are residents outside the mainland urban collection areas and in MUDs that do not have the same access to a food scraps collection service.
- Businesses do not have the same access to food scraps collection services that residents do.
- Significant food losses throughout the stages of food production and transportation increase the tonnes of food scraps on a per person basis.
- National incentives to avoid food waste are not sufficiently strong to change production or consumption behaviour.

Auckland Council through its waste and climate actions has set targets for considerable reductions in food waste, through our commitment under Te Tāruke-ā-Tāwhiri: Auckland's Climate Plan for the region to be Zero Waste by 2040, and carbon neutral by 2050.

Food produced and intended for human consumption but not consumed by people - due to wastage generated throughout each stage of the food system and value chain - results in numerous adverse environmental, social, and economic impacts including the generation of greenhouse gas emissions. Recognising the wins that can be achieved by reducing food waste, and in support of increasing national and global efforts, the Office of the Prime Minister Chief Science Advisor is currently undertaking research on food rescue and food waste[49]. The investigation will be completed in 2023 and builds on existing work, including a food waste report and set of recommendations provided to the NZ government Environment Committee in 2020[50]. The introduction of the council's kerbside food scraps collection service is anticipated to reduce household food waste by approximately 50 per cent. The remaining 50 per cent will require further actions to target food waste at all stages of food production, supply, distribution and commercial consumption.

The only way to understand where the council can influence the impacts of food wastage, is through a comprehensive analysis and mapping exercise to understand food flows through the Auckland economy and identify interventions at the points where it becomes waste.

This analysis was carried out by Sapere Group in 2023[51], and the data will be used to track our progress as we move closer towards our 2050 carbon goals. This study is appended to this waste assessment in Appendix F.

Through this work Council attempted to understand the emissions footprint of the food consumed in Auckland - not just the emissions directly from producing food within the city's boundaries (i.e., from the

[49] https://www.pmcsa.ac.nz/topics/food-rescue-food-waste/
[50] Environment Committee briefing in investigate food waste in New Zealand 2020
[51] "Mapping Auckland's Food System" by Sapere Research Group, August 2023

energy consumed in food production in Auckland), but also those associated with all food Aucklanders consume that are imported from elsewhere.

Auckland is home to around 1.67 million people, and the region's consumption-based emissions embedded within the products consumed in the city, are several times higher than those of the territorial authorities feeding our region.

The research found that close to 2 million tonnes of food is destined for Aucklanders' plates each year, or around 1.1 tonnes of food for every Aucklander. This is significant compared to a city like London, with a population of 8.9 million people, where approximately 6,347,000 tonnes of food is produced to supply London's food system each year[52] (around 700kg per person).

Key findings from Sapere's study include:

- Food manufacturers in Auckland produce 569,000 tonnes of food, and discard 29,941 tonnes, 24 per cent of which goes to landfill, 63 per cent to stock feed and 10 per cent to composting or rendering.
- Supermarkets discard 21,081 tonnes of food each year, with 23 per cent of those food products going to landfill, 15 per cent going to food donation programmes, and 46 per cent to animal feed.
- A further 13 per cent of the food purchased by consumers from supermarkets is wasted (103,950 tonnes a year) within the household. The most wasted food types are fruit, vegetables, meat and bread.

There are significant food losses at all stages of Auckland's food system, but particularly noteworthy areas are in tonnages lost or spoiled in transport, with as much as 121,544 tonnes of food wasted during importation. These losses are attributed to shipping containers that go missing, and the failure of refrigerated shipping container units, which makes the food unfit for human consumption.

[52] https://relondon.gov.uk/wp-content/uploads/2021/11/ReLondon_Londons_food_footprint_online.pdf

Case Study 3: Kai Ika Project – Fish for the People

As identified through the Auckland Food Map, the fishing industry is one of the more wasteful food producers, wasting more than 50 per cent by weight of what is caught and landed. Some of this waste is thrown back overboard while still out at sea, while another portion is wasted as a result of the filleting process, which leaves behind a head and frames which still contain a lot of meat to cook with and provide nutrition.

A joint initiative by recreational fishing representative association LegaSea and the Papatūānuku Kōkiri Marae in Mangere began rescuing the fish frames and heads in 2016 to be redistributed to feed the community and received an Auckland Council Waste Minimisation and Innovation Fund grant of $33,000 in 2018 to help fund the capital investment for a solar-powered fish filleting trailer at Westhaven Marina.

The project is now able to divert two tonnes of seafood a week from landfill and provide valuable nutrition to communities who need it.

Their presence at Westhaven has provided an opportunity to raise awareness among recreational fishers, including fishing charters, around the need to rescue waste fish before it goes to landfill. The permanent set up has also led to the creation of three full-time jobs, and fish is taken away using reusable Sistema containers which can be brought back and refilled.

Kai Ika are now replicating the model with a satellite filleting station in Wellington.

The initiative was also able to expand to take frames and heads discarded by Moana Fisheries and Sanfords, two of Auckland's largest seafood companies.

The group has begun using its reputation and influence to gain greater reach, through the Free Fish Heads initiative, building an App that people in other parts of the country can use to give away unwanted fish heads and frames within their local communities.

8.2.3 Packaging

Packaging has been identified as a priority waste stream because there are risks to the long-term success of the recycling system as a means of diverting packaging. In summary, the key issues are:

- A lot of council waste and resource recovery resources are spent on managing packaging. These resources could be utilised higher up the waste hierarchy.
- Contamination rates in kerbside collected materials are increasing
- Markets (both national and international) for certain sorted recyclables remain fragile and volatile.
- The national container return scheme for beverage containers has been deferred
- Reusable/refillable packaging systems are not widespread
- International/National incentives to design out packaging waste are not sufficiently strong to encourage redesign

At its most base level, product packaging serves to protect the product inside. Packaging must keep the product safe during shipment between the manufacturing facility and the retailer. It must also prevent damage while the product sits on the shelf, while it is being transported home by the consumer and while it is stored prior to use. Product packaging must therefore be sturdy and reliable. While the packaging protects the resources embodied in the product, the packaging itself also embodies energy (emissions) and resources. After its relatively short life, the packaging generates waste which requires collection for disposal, recycling, or reuse.

Packaging is a major consumer of raw material resources – globally, it's the single biggest consumer of plastic, at 36 per cent. In NZ, around 60 per cent of plastic resin imported into the country is made into packaging. Similarly, over half of paper consumption globally is for packaging. Demand for packaging is a key driver of raw material consumption.

Packaging is a potential human and environmental health risk during its use-phase as well as its post-use phase due to the range of potential chemical additives used to enable the base materials to perform the desired functions for the packaging, such as grease and water repellent, heat resistance, and flexibility.

While plastic is commonly singled-out in relation to chemical additives (e.g. bisphenols, phthalates and other Endocrine Disrupting Chemicals), fibre-based packaging often has additives that can be harmful to human and environmental health too – a commonly-cited example is PFAS. Fibre-based packaging types also produce methane when in landfill as discussed earlier, which contributes to Auckland's emissions from waste profile.

In food contexts, some of these additives can transfer to food and drink contained in the packaging. Additives can also concentrate or be increased through recycling. If products are composted, they can contaminate soil. Therefore, the way packaging is currently used and designed is really challenging the circular economy principle of designing out pollution, as well as the principle of regenerating nature.

Packaging and kerbside recycling systems

Kerbside recycling systems have been designed to enable largely single-use packaging materials that enter homes (post-consumer packaging) to be collected, sorted and reprocessed into new products, including

new packaging materials. Other commercial collection systems exist to manage packaging generated by the wide range of commercial and industrial activities, including manufacturing, retail, and hospitality.

The recycling system has become a successful means of recovering and reusing the resources contained within packaging, to then be traded as global commodities. In a 2023 national infrastructure stocktake of the waste and resource recovery sector[53] reports recovery rates for recyclable materials (Table 28). These rates are from all sources of the recovered material, not just packaging recovered from kerbside collections. The recovery rate for plastics is low compared to the other materials and is comparable to a 13 per cent plastics recovery rate determined for Auckland from research recently undertake for council by Eunomia (Appendix H.1). This reflects both the wide usage of plastic materials across a wide range of products, packaging and sectors, and the limited range of recovery pathways including kerbside recycling of household plastic packaging.

Table 28 National recovery rates of glass, fibre, metals and plastics

Material	Reprocessing (tonnes per annum)	Disposal (tonnes per annum)	Percentage recovery (%)
Glass (bottles, flat glass)	200,000	120,000	59%
Fibre	550,000	280,000	68%
Metals	712,000	130,000	84%
Plastics	55,000	445,000	11%

Despite its historic success, the industry has been under pressure since 2018 due to the collapse of global commodity prices following market access restrictions (that started in China then spread to other markets), then supply chain disruption due to the Covid-19 pandemic and recently there has been high inflation. The cost of the council providing the service has increased and at times, material has had to be stockpiled for long periods, or in the worst case landfilled, due to a lack of viable markets. This has prompted a closer look at how the recycling system works and where improvements could be made.

Sorting facilities, or Material Recovery Facilities (MRF), are about producing the highest quality of bales, at the least cost, with the least loss of recyclable material disposed to landfill. Auckland Council has upgraded its Onehunga MRF in recent years to improve the automated sorting equipment within the plant. This was funded using a central government grant from the Covid Response and Recovery Fund (CRRF). These upgrades have enabled high quality bales, of fibre and plastics, to be produced by the MRF that meet export quality standards for international commodity markets. However, ensuring high quality bales has meant a higher rejection rate, resulting in higher amounts of materials requiring disposal and/or additional sorting to recover recyclable materials.

National approach

New Zealand's geographic isolation and small size make it difficult to undertake onshore reprocessing of recyclables at a cost that competes with international, larger facilities. Local economically viable end markets do exist, however. Glass is one commodity that has always been recycled within New Zealand, using the Visy furnace in Penrose. The sunk investment in this facility makes this an ongoing viable local

[53] Waste and Resource Recovery Infrastructure and Services Stocktake and Gap Analysis, Eunomia Research and Consulting, 24 March 2023

market. There has also been a lot of investment internationally in reprocessing equipment as countries look to improve the viability of their recycling systems without access to traditional Asian markets. This investment means going forward that there will be more markets available for New Zealand to sell their recyclable product to, provided we continue to produce high quality bales. In order to address long term international market access, there may be a place for national supply agreements, so that high quality bales from New Zealand are seen with high value in overseas markets, overcoming the challenges of international shipping risks such as the Basel convention.

At a national level, central government has been focused on addressing the challenges in the recycling system, particularly relating to packaging. The Ministry for the Environment investigated options to introduce a national labelling system for recyclable packaging in 2021[54], which included the recommendation to introduce the Australasian Recycling Label[55]. Around the same time government recognised plastic packaging as a priority product[56] and introduced regulations to phase out some types of plastic packaging and some single use plastic products. They have recently announced standardisation of household recyclable materials collected at kerbside that will come into effect from February 2024. A national education campaign is planned to improve the use of the recycling system and to help reduce kerbside contamination.

Beverage Container Return Scheme

Auckland Council, along with MfE and Marlborough District Council, were involved in the design of a national Container Return Scheme (CRS) in 2019 for beverage containers. Although currently deferred by government, a CRS is expected to improve the quantity and quality of materials collected. A CRS for beverage containers would not replace a kerbside recycling system, as the service would still be needed to enable the recovery of other packaging and materials, such as cardboard and paper, glass jars and janitorial containers.

In early 2023, the government put out a tender for research, options and recommendations to inform future policy development towards a national scale refillable beverage container system in New Zealand. This was deferred along with the CRS announcement, but demonstrates the government is interested in exploring reusable packaging system development. Reusable packaging systems was also included in the national stocktake of waste and resource recovery infrastructure published by the Ministry for the Environment in 2023.

Designing-out packaging waste

Despite various industry-led global and national commitments to achieve circular packaging systems, such as the ANZPAC Plastics Pact[57] which is enabled by the Ellen MacArthur Foundation, there remain few national policy settings and regulations to incentivise redesigning packaging to design out waste. Moving up the waste hierarchy, there are opportunities to reduce the volume of material entering the recycling system in the first place, by designing out the need for packaging, redesigning packaging to reduce waste, and by implementing reusable (or refillable) packaging systems.

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[54] https://environment.govt.nz/publications/recycling-labelling-options-for-new-zealand/

[55] https://planetark.org/programs/australasian-recycling-label#:~:text=Australasian%20Recycling%20Label-,What%20is%20the%20ARL%3F,reduces%20waste%20going%20to%20landfill.

[56] The design of a mandatory NZ product stewardship scheme for plastics packaging is currently underway. It is being led by the Packaging Forum, Food and Grocery Council with support from the Ministry for the Environment. https://ppps.org.nz/

[57] *https://anzpacplasticspact.org.au/* - "100% of plastic packaging to be reusable, recyclable or compostable by 2025".

When designed well, B2B reusable packaging systems help to avoid or reduce both waste and emissions, strengthen efficiencies within businesses, and promote wider collaboration within the local economy for collective benefit. B2B reusable packaging systems also reduce often hidden single-use waste through the supply chain that sit outside council's direct sphere of influence.

Research into the opportunities that reusable business-to-business (B2B) packaging systems offer Auckland, from both established systems and future potential systems, and the current gaps in the sector was undertaken by Reuse Aotearoa on behalf of Council in 2023[58] (included in Appendix H). Their report details a case study from the Australian Packaging Covenant Organisation (APCO) estimating 2.5 million tonnes of single-use B2B packaging is avoided annually from the flow of reusable packaging in Australia (which represents only 2- 3 per cent of total packaging put to market). APCO estimated that for each kg of reusable packaging put to market 16kg of single-use packaging was avoided, on average.

Reuse Aotearoa's study also identified that Auckland is home to various well established, functional, and impactful reusable business-to-business packaging systems (e.g. reusable wooden/plastic pallets, crates, kegs, various containers) that service a range of different sectors. However, many gaps and critical needs remain to extend the impact of reusable packaging systems.

8.2.4 Nappies and sanitary products

Nappies and sanitary products are the second largest component of residential kerbside waste to landfill, 12 per cent by weight. They contribute 3 per cent of the total waste to landfill by weight and 3 per cent of the biogenic methane emissions from waste.

In summary the key issues are:

- Reusable products are available, but their use is not widespread.
- Recycling and recovery services are available, but none have been proven at scale.
- There are no processing facilities to support widespread introduction of recycling and recovery services.
- With an ageing population, the volume of nappies does not change, but rather their use shifts from the young to the old.
- As well as systems for use in the home, institutions such as childcare centres, aged care facilities and hospitals require systems that are convenient to use in their group settings.

Disposal of these wastes to landfill appear to be stable, making up 12 per cent by weight of household waste in kerbside refuse and 3 per cent of total waste to landfill. They retain their place as the second highest proportion of kerbside refuse after organic waste.

Once the rukenga kai/food scraps service is embedded across Auckland and this resource stream is diverted from kerbside refuse, nappies and sanitary will make up 20 per cent of the remaining waste. If all divertible material (compostables and recyclables) were removed, nappies and sanitary would make up almost a third

[58] "B2B Reusable packaging infrastructure and reverse logistics in Auckland: scope of current activity and gap analysis" by Reuse Aotearoa, August 2023. Appendix G.

(32 per cent) of the residual waste in kerbside refuse, making it the largest identifiable and ever-increasing category of household waste.

Emissions from our domestic kerbside refuse collections make up 30 per cent of the total emissions from landfill. Nappies and sanitary contribute six per cent of emissions from kerbside refuse (three per cent of total landfill emissions). When food scraps are removed from refuse bins, nappies and sanitary will contribute 14 per cent of emissions from kerbside refuse.

Waste avoidance through substitution is the ideal way to reduce the environmental impact of nappies. Auckland Council actively promotes re-useable nappies and other waste minimisation measures through the waste-free parenting programme, aimed at parents of newborns and at childcare centres. This work is likely to continue, but it is unlikely to address the full scale of this waste stream. Work could be ramped up if nappies and sanitary products are recognised as a priority waste stream and there may be opportunities in relation to subsidies and grants for example childcare centres to adopt reusable products, or procure washing services.

Furthermore, as the population of Auckland ages, the use of adult incontinence products will rise. There are currently limited opportunities for waste reduction or recycling of these, and the social stigma of adult incontinence makes this a sensitive waste stream to address.

Overseas processing solutions

Collection and processing options are beginning to emerge overseas. For example, in Wales, a nappy processing and recycling facility (NappiCycle[59]) recovers cellulose and plastics from nappy and incontinence wastes. By washing and breaking down dirty nappies, it processes the remaining fibres into pellets which can be used as a replacement for raw material for a number of applications, including roading, cladding and the production of fibre boards and acoustic panelling. Separate weekly or fortnightly collections of nappies and other absorbent hygiene products are offered in 15 out of 22 local authorities in Wales where it has been possible to reduce kerbside refuse collection frequency to every 2, 3 or 4 weeks.

In Toronto's City Green Bin Program[60] has shown anaerobic digestion works for disposable nappies in Canada where nappies have been collected separately in their green waste system for over 20 years.

In Australia, a number of trials and innovations have taken place in recent years, using a variety of processing techniques for example:

- Bega Valley Shire Council[61] undertook a trial in 2019, which provided 50 local families with compostable nappies to use instead of disposable ones. After use, these were processed successfully through the local Food and Organics (FOGO) facility.
- The Nappy Loop[62] trial in South Australia: uses anaerobic digestion to turn nappies from early learning centres into compost. The process also generates bioenergy that is captured and can be used to power the recycling process. Plastic components are separated and being evaluated for future recycled products.

[59] https://www.nappicycle.co.uk/
[60] https://www.toronto.ca/services-payments/recycling-organics-garbage/houses/
[61] https://begavalley.nsw.gov.au/council/local-families-help-council-with-nappy-trial
[62] https://www.huggies.com.au/nappy-recycling

- In Melbourne, a recent start-up, DiaperRecycle[63], has started offering a household nappy collection service and is processing the collected nappies into flushable cat litter, which is made from the compostable fibre component, with separated plastic from the outer covering sent for recycling.

Policy, collection and processing systems will need to be considered collectively to address this growing issue in the Auckland context, however processing solutions will come at a considerable cost, which adds to the case for investing in avoidance methods. This is an opportunity to recognise and allocate funding according to the waste hierarchy and apply creative circular thinking and invest in the community to support delivery.

8.2.5 Textiles

Textiles are a priority waste both because of the embodied emissions generated during their manufacture/transport and because they are one of the fastest growing wastes to landfill. Systems for tackling a reduction of waste generation upstream at the top of the waste hierarchy, along with recovery and diversion of textiles from landfills are not keeping up with the demand generated by the 'fast fashion' approach to selling clothing and other textiles. Other sources of textile waste to landfill include carpets and upholstery, both synthetic and natural.

Textiles are one of the fastest growing material streams being landfilled in Auckland, albeit from a relatively small baseline. Although small in volume, from a greenhouse gas perspective, they are the fifth largest contributor to emissions from waste. Textiles also have a large global environmental footprint, second only to the extractive oil and gas industries.

Textiles include clothing, uniforms, homewares including bedding and towels, carpets and upholstery.

Globally, 'fast fashion' and the rise of cheaper, poorer quality clothing and other textiles are having an impact. Some fabrics are easier to recycle than others.

Diversion potential within New Zealand is primarily reliant on second-hand clothing stores and clothing recovered through clothing bins. These schemes have been under pressure in recent years due to clothing bins and second-hand stores becoming illegal dumping sites for general household waste. The poor quality of clothing being discarded also makes resale and reuse less possible. As a result, the availability of these outlets is not keeping pace with need, and the existing ones are being left to foot the bill for disposal.

Materials Recycling Facility data shows textiles also find their way to landfill, or into recycling bales, through householders putting clothing and bedding into kerbside recycling bins. Around 5,000 tonnes of textile waste is discarded to landfill each year through this pathway.

Carpets are also a significant contributor to textile waste. A 2020 review of circularity in the clothing and textiles industry in Aotearoa conducted by The Formary found (national data extrapolated for Auckland) around 49,447 tonnes of carpets are sent to landfill from Auckland homes and businesses each year.

This is a mix of woolen and nylon carpets, both manufactured locally, and synthetic carpets manufactured overseas. 4000 tonnes of that carpet waste comes directly from the installation process (eg through

[63] https://diaperrecycle.com/

offcuts). The average lifespan of commercial carpet is six years, and the average lifespan of domestic carpet is 15 years.

While 100 per cent of woolen carpets can technically be recycled here in Auckland via Textile Products (depending on access to collection systems), there are no recovery options for synthetic carpets.

Some waste reduction initiatives in commercial settings can include using carpet tiles, which can be individually replaced when worn, rather than needing to replace an entire floor.

2021 UK Government (DEFRA) data[64] shows that for every tonne of clothing landfilled, around 22 tonnes of CO2-e is emitted through the production phase, the majority of which is produced because a large proportion of clothing fibres are synthetic made using virgin fossil fuels.

Auckland Council engaged Sapere Research Group to conduct an analysis for this Waste Assessment around the flows of clothing through the Auckland economy, consumption patterns and waste generation, to better understand Auckland's clothing footprint, and where opportunities exist to reduce the tonnages of textile waste being disposed of in landfill.

As clothing breaks down in landfill it releases two times its weight in greenhouse gases. For example, in Auckland textiles contribute to five per cent or approximately 74,000 tonnes of the total waste entering landfills each year, but textiles are responsible for 10 per cent of CO2-e of emissions from landfill. Of those 74,000 tonnes of textiles, around 16,000 tonnes are clothing. Globally and in New Zealand, there are few recovery options for turning textiles into new textiles, or other products.

The Sapere research found that Aucklanders consume around 25,000 tonnes of clothing each year, or 14.8kg per person and discard around 10kg a year. Only a small proportion (around 25 per cent) is able to be absorbed by the second hand/reuse market. This research report is included in Appendix I.

The question we need to be asking then with regard to textile waste is not what we should do with the waste, but how can we stem the flow and reduce the high rates of consumption. This will require a significant cultural and cognitive shift and because the proportion of the population who care about this issue is small, change may need to come through regulation.

There are opportunities, however. Around 10,000 tonnes of new clothing is manufactured in Auckland. Within the region identifying options to influence better design and durability with local brands, to incorporate more circularity and extend the life of apparel items can be explored further.

With focus, coordination and effort, the New Zealand clothing industry could be a demonstration of how a linear 'take-make-dispose' model could transition towards something more circular. Proponents of fast

Overseas, the burden of unsustainable clothing consumption on the environment is being recognised and regulated. For example:

[64] Department for Business, Energy and Industrial Strategy & Department for Environment, Food and Rural Affairs, UK Government GHG Conversion Factors for Company Reporting, v1.0, June 2022

Europe

On 1 July this year the European Parliament adopted recommendations for an EU Strategy for Sustainable and Circular Textiles top address unsustainable patterns of overproduction and overconsumption[65]. Going forward, textile products sold in the EU will need to be more durable, easier to reuse, repair and recycle and their production should respect human, social and labour rights, the environment and animal welfare throughout the supply chain.

The vision of this strategy being that by 2030 textile products placed on the EU market are long-lived and recyclable, to a great extent made of recycled fibres, free of hazardous substances and produced in respect of social rights and the environment. Consumers benefit longer from high quality affordable textiles, fast fashion is out of fashion, and economically profitable re-use and repair services are widely available. In a competitive, resilient and innovative textiles sector, producers take responsibility for their products along the value chain, including when they become waste. The circular textiles ecosystem is thriving, driven by sufficient capacities for innovative fibre-to-fibre recycling, while the incineration and landfilling of textiles is reduced to the minimum.

Australia

In 2022, the Australian Fashion Council released a Roadmap to Clothing Circularity by 2030, which includes the implementation of a national voluntary clothing product stewardship scheme, one of the features of which is a 4 cent levy on every garment sold, which can be invested education for more sustainable shopping, in better design, collection and sorting processes and also investigating and funding recovery infrastructure. In a powerful speech at the launch of the Seamless Product Stewardship Programme in June 2023, Australian Environment and Water Minister Tanya Plibersek told the clothing industry that they had 12 months to get on board with the scheme or she would regulate participation[66].

8.2.6 Advocacy for priority products

The government has declared six priority products for which regulated product stewardship schemes are being developed. These are products that may cause significant environmental harm or have been difficult to recycle. In summary, the key issues are:

- *Only some of the priority products have seen schemes designed to completion/accreditation, and even these are still awaiting the publication of the necessary regulations*
- *Existing voluntary schemes for some of the priority products do not have universal coverage, enabling "free riders"*
- *Ongoing management of the health, safety and environmental impacts of these priority products is needed until schemes are designed and accredited, and regulations are in place.*
- *More oversight and advocacy is needed to ensure product stewardship schemes incorporate measures and expectations to achieve outcomes higher up the waste hierarchy, such as reduction, reuse, repair, and to drive uptake of circular business models.*

[65] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52022DC0141
[66] https://ausfashioncouncil.com/minister-plibersek-takes-a-stand-against-clothing-waste/

The government have declared six priority products for which regulated product stewardship schemes are being developed. These are products that will or may cause significant environmental harm when they become waste, or there are significant benefits from improving the circularity of their management, and they can be effectively managed under a product stewardship scheme. The six products are:

- plastic packaging
- tyres
- electrical and electronic products (including large batteries)
- agrichemicals and their containers
- refrigerants and other synthetic greenhouse gases
- farm plastics

Work is underway to design and implement product stewardship schemes for these products, which is a lengthy and complex process. At the time of writing, schemes for each of the products are at different stages of development. Some of the products are still in the design phase (e.g. plastic packaging), while others have completed the design process and received accreditation (e.g. tyres). Proposed regulations for three product categories have been through public consultation (Tyres and Large Batteries in 2021, and refrigerants in 2022). However, no regulations have yet been enacted for any scheme, but it is expected that regulations for tyres will be published before the end of 2023, which would make Tyrewise New Zealand's first regulated product stewardship scheme.

Some of these priority products are covered by existing product stewardship schemes that were accredited prior to the products being declared "priority products", such as Cool-safe for refrigerants or Agrecovery for agrichemicals and their containers. As such, these product stewardship schemes are voluntary schemes for which the regulatory power under s 22 of the WMA to mandate participation in the scheme is not available. Therefore, those that do not want to participate can avoid the responsibility and costs associated with the schemes. Until the new schemes are designed for these products, accredited and then regulations made to prohibit the sale of the product except in accordance with the scheme, scheme coverage remains incomplete.

In the meantime, these difficult wastes continue to cause harm to the environment and health and safety incidents, such as fires, continue to occur. There will be a need for Auckland Council to continue to appropriately manage the impacts of these wastes until the product stewardship schemes are developed.

Although these are national schemes, Auckland Council can advocate for their introduction and support the design and implementation to be progressed. For example, Council was involved in the co-design of the beverage CRS. Council's network of community recycling centres could also be made available in future as part of a network of collection points for returned products, alongside retail outlets.

Refrigerants

Refrigerant gases are all around us, keeping our food cold, our cars, offices and homes warm or cool. Refrigerant is 'wasted' when it leaks into the atmosphere, or when the appliance is discarded.

The average domestic fridge or freezer contains between 100-500 grams of refrigerant, while the average domestic heat pump contains between 1-2 kg. To put this impact into perspective, if one heat pump containing 2 kg of common legacy refrigerant R410A was released into the environment, the Global

Warming impact would be equivalent to the average distance a New Zealand male[67] drives in three and a half years (29,346km[68)] or running a 10 Watt LED lightbulb for 97 years.

The Kigali Amendment, which came into effect in January 2019 and extended the scope of the Montreal Protocol to include Hydrofluorocarbons (HFCs), aims to reduce the production and consumption of these climate-damaging substances by 85 per cent by 2045.

And so, while refrigerants in newer refrigeration equipment are gradually being replaced by gases with lower Global Warming Potential (GWP), Auckland Council's concern is with the current gases inside existing stocks of domestic and commercial equipment.

In 2020, refrigerants were declared a priority product for regulated product stewardship under the Waste Minimisation Act 2008, intended to place responsibilities for managing end-of-life products onto producers, importers and retailers rather than on communities and councils.

The current situation, under a voluntary scheme, is that the collection of domestic appliances direct from the public lacks national coordination and is relying on councils and community groups to fill the gap if equipment has not been degassed at the time of replacement or decommissioning. Councils do not have the authority or resources to intercept every heat pump before a building gets demolished and many fridges get discarded at a transfer station without being degassed. Refrigerant gas release also occurs after natural disaster events. Hence the need for urgent accreditation of a product stewardship organisation for refrigerants.

Cool-Safe currently offers incentives for recovered refrigerant from industrial, commercial, and domestic equipment, and a free courier pick up service nationally and two physical collection sites in Auckland (10 nationally). This has been highly effective resulting in a 16 per cent increase in refrigerants recovered with over $500k of incentives earned since Oct 2022. However, this service is only accessible to those who have undergone training to safely decommission equipment and have the knowledge and equipment to handle refrigerants, not the members of the public. Cool-Safe's refrigerant recovery programme is utilised by NGO's and councils who are appropriately trained to recover and receive the rewards.

Legislated environmental performance/resource efficiency requirements (discussed above) would also ensure that pre-charged equipment entering the New Zealand economy was built to a higher standard with less risk of refrigerant leakage and ensure availability of spare parts and durability of products extending product lifespans.

Other specific aspects relating to product stewardship schemes and potential future products which could be focused on are discussed in the following sections. Textiles as another specific product not yet identified as a 'priority product' by government is discussed separately in an earlier section.

Right to Repair and resource efficiency performance requirements

Where manufacturers and retailers absorb the full environmental cost of their products, there are greater incentives to improve production quality. In line with the waste hierarchy, product stewardship schemes should include measures to extend product lifespans to reduce material extraction, consumption and waste generation. One example of this is reuse activities such as repair. Repairing a product retains much more of

[67] https://www.transport.govt.nz/assets/Uploads/Report/Drivers-Travel-Survey-2015.pdf
[68] https://www.oekorecherche.de/en/refrigerant-calculator

its embedded value, which is lost when a product is recycled. Repairing devices instead of replacing them could create a 92 per cent reduction in potential waste generation and GHG emissions[69].

However, most products on the market today are not designed for repairability and it can be expensive or difficult to find repairers. Right to repair laws are one way that jurisdictions are seeking change this situation.

The Repair Café Aotearoa New Zealand (RCANZ), WasteMINZ, Greenpeace and Consumer NZ have called on the House of Representatives to ask the central government to design comprehensive Right to Repair Laws to ensure that products put on the market in New Zealand meet basic standards of durability and repairability, and that product stewardship schemes cover the costs of repair and recycling.

The petition draws on the work and research of groups like WasteMINZ that have been exploring what a right to repair could look like in New Zealand. Consumer NZ has also launched a petition to the government calling for a product repairability label.

Other measures that would support long-lasting, repairable products would be legally binding performance requirements for products based on resource efficiency. These would be similar to energy efficiency requirements that already exist in New Zealand, but extended to new criteria like repairability, durability and reusability. This year, the EU proposed a far-reaching sustainable product regulation that would introduce a framework enabling these types of performance requirements, and the information provision to go with them, for products put on the European Market.

In New Zealand, creating consumer protections that would mean products could not be sold here unless they can demonstrate they meet a minimum eco-design criteria for durability and repairability has the potential to prevent the creation of more than 32,000 tonnes of electronic waste in Auckland every year.

Currently, there is no economic or regulatory incentive for manufacturers to change product development. It is widely accepted that "the cost of repair is often disproportionately large relative to the cost of replacement, which contributes to a culture of replacement over repair and erodes the financial viability of repair as an enterprise for many products."[70]

Auckland Council sees first-hand the impact of low-quality household items and planned obsolescence, through illegal dumping clean ups, through large volumes of valuable resources lost to landfill, and through the experience of Aucklanders who are unable to afford the cost of having to frequently replace household goods and the cost of removal/disposal.

The second waste legislation cabinet paper on regulating products and materials to promote circularity has proposed that the new waste legislation include provisions to enable the settings of environmental performance requirements for products, which would include measures similar to those described above, including right to repair provisions. Auckland Council supports these proposals and will advocate for their inclusion in new waste legislation. We will also continue to advocate for the need for product stewardship schemes to cover the costs of reuse activities, like repair, to ensure that these services will be as accessible as possible and that those who work in these sectors will be fairly remunerated.

[69] Executive Summary: An assessment of the greenhouse gas emissions and waste impacts from improving the repairability of Microsoft devices. Oakdene Hollins April 22, 2022.
[70] Product Stewardship Sector Group steering committee submission to the government on Right to Repair in Aotearoa New Zealand.

Mattresses

Unwanted mattresses are a large and difficult-to-manage waste stream. It is estimated as many as 100,000 mattresses are discarded from the Auckland region each year. Because they are large and bulky and people don't always have transport, a number of those get discarded through the Auckland Council inorganics collection, or dumped by roadsides which then need to be cleaned up by Auckland Council's illegal dumping contractor at a cost to ratepayers. In just the first six months of 2023, 666 mattresses were collected by Auckland Council's illegal dumping contractor.

Recognising the scale of the problem, in 2017, Auckland Council's Waste Minimisation and Innovation Fund supported a pilot mattress recycling programme called Rebound. Around 90 per cent of the materials within a mattress are recoverable. The project managers 3R Group had been working closely with the mattress manufacturing and retail sector to encourage the industry to play a role in the recovery of old mattresses. While the scheme pilot was successful in proving the concept, without a secure funding source such as an advanced recycling fee per new mattress sold, the programme was financially unsustainable. Without a fee, there is no money to pay collectors, handlers and dismantlers to do the work of ensuring they get recovered.

This is why mattresses remain a good candidate for product stewardship and Extended Producer Responsibility approaches to reduce waste to landfill, create incentives for better design for recovery, and limit the impact on the environment and the community through illegal dumping.

Hazardous Waste

Significant volumes of hazardous wastes are imported and exported to and from NZ each year. Tonnages and waste types fluctuate year on year, however:

- Import export data from 2021 shows 19,645 tonnes of electronic waste was exported from New Zealand to the Republic of Korea, Japan, Australia and Belgium. A large proportion of this was lead acid batteries.
- A further 1,358 tonnes of chemical waste in the form of pesticides, solvents, PFAS-contaminated waste, spent pot liner, spent catalyst, and cytotoxic waste was exported to countries including Australia, Germany, France, Spain and Singapore.
- In keeping with the Basel Convention, New Zealand allows Pacific Island nations to export chemical wastes here that cannot be treated and disposed of locally. Through the importation of waste in 2021, New Zealand received 9,337 tonnes from New Caledonia and French Polynesia.

There are weaknesses in the system contributing to data reliability issues, for example importers and exporters choose their own tariff codes, and those tariff codes aren't being consistently applied across all waste types.

The lack of regulatory tracking and oversight when a hazardous material becomes waste makes this point in its life cycle higher risk in terms of creating environmental or human harm. The public puts trust in authorities to create a framework where they will be kept safe from hazardous chemicals. In contrast, in jurisdictions like the US, EU and Australia where major pollution incidents have led to sizable damages claims and compensation from local and national government for allowing pollution to occur, much more stringent liabilities on industry exist, in particular responsibilities for hazardous waste generators.

The Government has recognised this gap, and in Cabinet Papers seeking policy decisions on the content of new waste legislation, proposals are included to give greater responsibility to all of the actors along the life cycle. In the cabinet papers, the Minister for the Environment recognises that there are stockpiles of hazardous waste that have accumulated without the knowledge of any regulatory authority, be that Council, WorkSafe, or the Environment Protection Authority.

The papers seek agreement from Cabinet to provide for a hazardous waste tracking system that would eliminate the opportunity for industrial hazardous waste to be mismanaged, through reporting details of transactions and movements of the material through the economy.

The cabinet papers confirm the lack of data and information is an impediment to evidence-based policy making and the ability to secure a conviction when hazardous waste is dumped or mismanaged. The cabinet papers also propose changes to the legislative framework for the import and export of hazardous waste, which is currently managed at the border through the Imports and Exports Act and managed by New Zealand Customs Service.

Auckland Council is supportive of the move to a single framework of primary waste legislation, to assure businesses within this region are compliant with the Basel Convention and provide powers to investigate and enforce breaches within this jurisdiction, some of which may sit with regional councils.

Scheme design, ambition and funding

Auckland Council has strongly advocated for mandatory product stewardship schemes for some time and continues to support the development and regulation of the product stewardship schemes for the six priority products. The time that has elapsed since the declaration of the first priority products in 2020 has offered the opportunity to reflect on the scheme design process and consider how the approach could be strengthened going forward – whether this is for product stewardship schemes, or extended producer responsibility schemes.

The industry-led co-design approach favoured by the Government seems insufficient to uphold the public interest value of product stewardship as a mechanism to bring about circularity in the economy. The process by which Government proposes, consults on, and then implements measures under s 23 of the WMA, such as the plastics phase-outs, seems a more organised and expeditious approach that mitigates the conflict of interest inherent in the regulated community designing the schemes to regulate their own products and businesses. Similarly, the process by which the beverage CRS was designed demonstrated more robust Government oversight and decision-making.

Therefore, Auckland Council will advocate for increased clarity about who should design schemes and how they should be designed, through updates of the waste legislation. The fifth Cabinet Paper on the waste legislation update on a legislative framework for extended producer responsibility proposes a clearer, more formalised set-up/design process, and higher levels of government oversight and leadership.

The Council will also call for a more streamlined and fit-for-purpose mechanism to fund product stewardship (or EPR) design, monitoring and ongoing iteration, and to adequately resource the government agency in charge of these processes. Allocating the contestable Waste Minimisation Fund to industry groups to design schemes may not be the best avenue for these public funds.

The Council would also like to see PS/EPR schemes that include meaningful measures to achieve outcomes at the upper levels of the waste hierarchy, including binding targets and mechanisms to finance to growth of preparation for reuse activities like washing and repair. We will continue to advocate for robust and ambitious schemes.

8.2.7 Disaster response and recovery

The Auckland floods and Cyclone Gabrielle, both in early 2023, have tested Auckland's disaster response and recovery systems. The frequency of these events is increasing due to climate change and there is a need to support the community to manage the high volumes of waste produced when these events occur. Responding to the 2023 events has highlighted the following issues:

- Coordinating the large number of temporary drop-off sites and skip bins needed to clear waste from communities, and the length of time these need to be available to the community.
- Greater certainty regarding the availability of additional disposal locations at short notice for very large waste streams e.g. silt in Hawkes Bay, liquefaction in Canterbury, potentially volcanic ash in Auckland.
- The number of waste facilities and closed landfills in low-lying areas, increasingly at risk in extreme events due to sea level rise.

Auckland Council is aware of the need to consider the resilience of the region's waste infrastructure and services, both in terms of continuing to operate following a natural disaster or other significant event, and managing unexpected and potentially high levels of waste generated as a result of impacts from climate-change.

Resilience of the Auckland waste network requires joint consideration from public and private service providers, working alongside communities and various parts of the council and central government. The National Adaptation Plan sets out what actions the Government will take over the next six years to help all New Zealanders adapt and thrive in a changing climate. This includes work that councils will need to undertake regarding infrastructure and assets that help to adapt to the risks of climate change.

For the council, it is a consideration for both waste and civil defence emergency planning. This relates to the network's ability to cope with large, unexpected and potentially hazardous quantities of waste generated from disaster scenarios (e.g. flood damaged material from the January 2023 Auckland floods; or exposure of legacy waste from sites at risk of flooding/erosion); and also the ability to continue to provide communities with safe and sanitary conditions around waste collection, processing and disposal (e.g. access restrictions due to slips following the January 2023 Auckland floods). Auckland's Resource Recovery Network can also play an important role in connecting communities with replacement goods and connecting community with organisations that can provide help.

Auckland Council's disaster waste management and response activities include the following:

- Reduction and Readiness (pre-disaster) – key planning step to understand the capacity of the existing infrastructure, potential weaknesses (e.g. points in the transport network, such as the Harbour Bridge, that could be compromised) and materials/wastes that could become an issue (such as locations of at-risk closed landfill sites)
- Response (post-disaster) – implementation phase which would include quantification of risks and waste volumes, and planning for both temporary and permanent waste management and any identified remedial measures.
- Recovery – longer term implementation, providing for both waste disposal and recovery of resources as activities return to normal.

The following list of lessons learnt from disaster waste planning appeared in the 2017 Waste Assessment. These have recently been tested in the Auckland context through the January/February 2023 flooding and Cyclone Gabrielle events. They remain the key focus areas for future planning:

- Multiple sites required for temporary storage of wastes, requiring initial identification (e.g. list of closed landfills/parks/other community facilities available for use) and longer-term regulation and inspection
- Challenges identifying different waste types and options for disposal/recovery - may be knowledge gaps for treatment/disposal of some wastes (e.g. volcanic ash)
- Cross-contamination a key issue arising during collection and storage (pre-disposal/treatment)
- Difficulty in segregating wastes due to volumes, compromising resource recovery
- Damage to roading network creating delays in both route identification and transport
- Continuation of regular services while also managing large volumes of disaster wastes
- Organic/putrescible wastes difficult to manage
- Cultural issues need to be better understood across disaster scenarios.
- Any new waste infrastructure should not be in high-risk locations e.g. areas subject to high flooding risk.
- The CRC network could potentially play a role in storing, segregating and recovery of disaster wastes, particularly in the recovery phase
- Auckland Council's focus on strengthening community resilience and stakeholder engagement around waste provides a strong platform from which to draw on, and support, the local community in the event of a disaster
- Waste services could potentially provide a means to deliver essentials to the community –use of collection routes, bins etc.

The council recognises that ongoing work is needed to ensure the region remains as prepared as possible to enable efficient response to any future events. With climate change, these events are likely to be more frequent, providing more frequent tests to the resilience of our disaster waste management systems.

8.2.8 Auckland Council Group in-house and operational waste

There is a need for the council and its CCOs to lead by example and "walk the talk" when it comes to waste minimisation. As the council makes progress towards a low carbon, circular economy, the following issues have been encountered:

- Auckland Council Group produces a diverse range of wastes across the services, facilities and infrastructure they build and operate, making it difficult to identify common priorities.
- Data reporting standards vary from project to project, making it difficult to aggregate and compare outcomes.
- Although Auckland Council Group divisions have led the way on some projects, overall waste minimisation and carbon reduction performance is inconsistent.
- There is a need to change the method for assessing office waste reduction due to a change in how we use our offices.

Section 4.5 summarises work across the Auckland Council Group to address in-house office waste and operational waste streams which is outlined in more detail in Appendix J.

Despite the initiatives underway there is opportunity to embed practices that reduce waste and carbon consistently across the activities of the council and its CCOs. These include:

- collating cohesive data across the council group on operational waste including waste from maintenance activities, excavation and construction and demolition waste.
- operating circular business models, including reusable packaging systems, second-hand resale, repair and maintenance services, or product-as-a-service/sharing system.
- testing and monitoring use and outcomes related to the deconstruction panel, and supporting displacement of demolition with deconstruction practices across the Auckland Council Group.
- investigating delivery of a panel of accredited waste contractors exploring future options to manage significant quantities of biosolids generated at Watercare's wastewater facilities.
- continuing to advocate for regulatory and systemic changes to support reuse or circularity of excavated materials and construction and demolition waste.
- Continuing work across the council group and with suppliers on a range of initiatives to support waste reduction including;
    - in the design phase of capital works projects
    - promotion of innovation, education and buy-in, and acknowledging quality sustainable waste procurement including through the council's Supplier Relationship Management (SRM) programme
    - providing and updating guidelines and tools to support waste reduction
    - supporting the development of site waste plans together with auditing of projects to understand where improvements can be made.
    - linking departments and CCOs to support opportunities to divert wastes including excavated materials and construction and demolition waste from projects and maintenance activities.
    - reducing reliance on hard-to-recycle and environmentally problematic materials such as expanded polystyrene in council's construction projects.

8.3 Proposed options

This section describes potential actions to reduce Auckland's waste to landfill, along with how those activities could be combined to form options for the selected basis of the next WMMP.

The options assessment considers the key issues of how waste services are to be delivered in a matrix. The assessment should not be considered an exhaustive list of options or specific actions that can be implemented as part of a WMMP, rather it includes those options assessed as being reasonably practicable.

Two options are presented which reflect i) the existing actions from the 2018 WMMP to represent the 'status quo', or ii) status quo plus additional actions that extend beyond the existing scope of the WMMP.

The options and actions presented should not be considered an exhaustive list, rather they represent options considered as being reasonably practicable to be implemented.

The actions proposed under the two options are all assessed against multi-criteria.

8.3.1 Option 1 – Full implementation of 2018 WMMP (status quo)

This option continues with the actions outlined in Auckland Council's 2018 WMMP, including continued actions supporting the optimisation of waste streams managed directly by council and actions to influence waste streams outside Council's direct control.

The following actions from the 2018 WMMP are in progress, ongoing, or intended to be rolled out in the next three to four years:

- Standardisation of the three-bin kerbside collection service across the region
- Extending the food scraps kerbside collection service
- Expanding the Resource Recovery Network.
- Supporting business to minimise waste, particularly in the C&D industry
- Ensuring households are able to dispose of hazardous waste responsibly
- Reducing waste in Council offices and operational activities
- Advocating for Waste Minimisation Act amendments to support circular economy, increasing the Waste levy and mandatory product stewardship schemes.

8.3.2 Option 2 – Full implementation of 2018 WMMP plus extension into new priority waste streams and areas of advocacy

This option builds on the 2018 WMMP actions and reflects the broader strategic priorities of developing a circular economy, reducing greenhouse gas emissions from waste, and prioritising actions higher up the waste hierarchy to reduce waste generation. The strategic priorities reflect both national and international commitments as described earlier in Section 2 - Legislative and Strategic Context.

The actions focus on the priority waste streams identified from the analysis of total waste to landfill data and future demand forecasting. While continuing to maximise the effectiveness of the services delivered by the council, there is an increased focus on the council's role in education, facilitation and advocacy to increase the level of waste avoidance and diversion of waste outside the council's control.

Option Two includes additional actions to:

- Increase efforts to maximise diversion from kerbside waste.
- Accelerate Council's contribution to Auckland's climate goals by expanding priorities to include waste and product streams that have high GHG emissions.
- Empower and equip businesses to minimise waste from their operations, with a focus on priority waste and product streams.
- Significantly expand and accelerate support for the construction industry to minimise waste to landfill.

- Ensure Auckland's waste infrastructure remains resilient in the face of climate challenges.
- Increase emphasis and efforts on reducing Auckland Council Group operational waste streams.
- Broaden advocacy to central government for timely delivery of the statutory and policy framework that will enable the shift to a circular economy.
- Prepare and pave the way for beyond 2030.

The delivery of Option Two relies on strengthening the council's partnership with mana whenua, and continuing the development of effective relationships with local communities, businesses and central government.

8.4 Assessment of proposed options

This section describes the assessment process the council has followed, and the thinking behind the scoring of each proposed action. This is intended to provide transparency and further detail on how each of the proposed options has been evaluated.

Table 29 and Table 30 provide further detail on the proposed actions and packaged options outlined above. Operational and delivery issues are noted for each, as are economic considerations, potential levels of diversion from landfill, social and cultural implications and any other associated risks. Collectively, these considerations form the basis of the multi-criteria assessment described in Table 31 and Table 32.

The consideration of potential risks includes resilience. This is more relevant to some options than others, and focuses on the ability to sustain the proposed service or infrastructure in the event of a natural or man-made disaster. Implications for waste could be through the generation of unexpected waste types and quantities, or the ability to sustain operation under extreme circumstances.

These issues, costs and reduction ability are based on the collective experience of council staff involved in the waste assessment, along with an extensive investigation and technical assessments that sit behind the waste assessment and current WMMP. Initial discussions with the community and private sector also inform the assessment, and will be revisited as part of the stakeholder engagement component of this review.

Unless otherwise stated, estimated potential tonnes of waste diverted from landfill and broad level costs are based on Auckland Council's analysis of available data and are indicative only.

Table 29 Option 1: Status quo - Full implementation of 2018 WMMP

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/economic	Social/cultural	Environmental	Operational	Risk
1.1	**Standardised three bin service for domestic customers with future move to fortnightly refuse for all customers (and an optional monthly refuse collection for some low waste producing households)**	Finalise transition to regionwide consistent services for all Auckland properties. North Shore, Waitakere and Papakura move to rates funded refuse collection service, implemented progressively from 1 July 2024. Introduce refuse service in Rodney from 1 September 2025. Private good funding of regionwide fortnightly recycling. Embed private good funded weekly rukenga kai/food scraps service in mainland urban Auckland. Continue private good funded weekly refuse collection service, moving to regionwide fortnightly refuse collection from 1 July 2026. Private good funding of inorganic service, litter collection, hazardous waste and removal of illegal dumping. Garden waste collection service continues to be provided by private collectors.	Council has greater opportunity to influence waste minimisation behaviour of council customers. Waste reduction potential influenced by size of bins made available (encourage 120L as default with 80L option available) Rates funded recycling collections encourages higher recycling rates. Potential to divert around 50,000 tonnes of food per year. A future shift to a fortnightly refuse collection offers further potential to reduce waste to landfill.	Shift to rates funded refuse: upfront cost for bin procurement for properties without a council bin, funded through Waste Levy. Improved efficiency at operational level via standardisation of service across the region. Potential cost savings for customers through standardisation of services. Potential cost savings for council and customers from move to fortnightly refuse collections.	Increased ease of use. Standardisation of funding approach and level of service offered across region. Removes need to pre-purchase bags/stickers. Bin storage – particularly for multi-unit dwellings. Beneficial for those who do not produce much waste. May disadvantage large families who produce more waste, unless supported by diversion options. Communications and awareness accompanying new service rollouts provide opportunity for public involvement and education. Emphasises focus on waste diversion and recycling. Cultural benefit via improved separation and reuse of wastes with higher discharge risk.	Environmental benefits from assumed result of less waste at kerbside, particularly with a future move to fortnightly refuse collection (waste reduction, greenhouse gas reduction, increased public safety and amenity with less trucks on the road). Food waste is collected weekly and anaerobically digested for energy and fertiliser generation. Reduces organic waste to landfill and associated methane and leachate discharges. Food scraps / rukenga kai service support reduction in frequency of refuse collection.	Space requirements for up to three bins placed at kerbside per dwelling – e.g. 240L recycling bin, 120L refuse bin and 23L food scraps bin. Improved health and safety for waste collectors via rates funded collection. Implementation of rates-funded service for those currently using user-pays bags/tags or private collection service requires effective communication and support for residents to facilitate changeover. Well tested, familiar system, already in place across much of the region. Increased capture of recyclables offers potential for increased operational efficiencies and driver for innovation. Creates opportunity for fortnightly refuse collection.	Mitigates reputational risk by Auckland Council meeting commitments made under 2012 and 2018 WMMPs. Reduced health and safety risk through automated versus manual collection, using runners. Assumes user health risk (e.g. from disposal of nappies and a fortnightly collection service) will be addressed by the council and the householder – e.g. handling/storage precautions, potential alternative service for sanitary wastes.
1.2	**Introduce a domestic kerbside food waste collection for areas currently outside mainland urban rukenga kai/food scraps collection area (as proposed by MfE)**	Food waste collections and processing solutions provided to extended service areas.	Potential to divert a further 39,000 tonnes per year based on 27,100 additional households receiving the service.	High level of investment to provide service. Increased viability with increased waste levy and/or carbon charge via ETS.	Opportunity for community partnerships and job creation. Potential for strong community support for more 'local' processing option.	Reduces organic waste to landfill and associated methane and leachate discharges. Unintended consequence of diverting from home composting systems.	May require partnership and/or contractual arrangement with community enterprises and/or private waste industry.	

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/economic	Social/cultural	Environmental	Operational	Risk
				Potential for some funding via waste levy. Can lead to reduction in frequency of refuse collection and reduction in costs.	Communications and awareness accompanying new service rollouts provide opportunity for public involvement and education. Products (compost/soil amendment and/or energy) available for local use.	Can lead to reduction in frequency of refuse collection.	Requires effective communication strategy. Creates further opportunity for fortnightly refuse collection.	
1.3	**Continue expansion of the Resource Recovery Network** **(as outlined in the Revised RRN Strategy 2021)**	Thirteen CRCs have been established, all operated by social enterprises. The Revised RRN Strategy (2021) supports the establishment of 21 CRCs and two Resource Recovery Parks by 2031. Potential to include C&D - specific facilities, organic waste and household hazardous waste facilities at some sites.	Estimated at 24,000t per year from 21 CRCs and two recovery parks.	Potentially high development/ investment costs, for new facilities. Shovel-ready funding received from central government in 2021 to develop existing sites. Potential to attract additional external funding for new sites. Requires market development for recovered materials to improve economic self-sufficiency. Product stewardship schemes (particularly a Container Return Scheme) will also improve economic self-sufficiency.	Improved access to resource recovery options for residents. Local job creation/training opportunities. Increased community involvement and education potential. Community resourcefulness and resilience. If incorporating hazardous waste, reduced human health risk from inappropriate storage/disposal. Provides residents with access to low-cost goods and materials. Enables residents to reduce their waste disposal costs by sorting reusable and recyclable items from refuse.	Diversion from landfill. Focus on consumption and moving up the waste hierarchy. Reduced greenhouse gas emissions. Applies user pays principle to help drive diversion. Reduces drive times for residents dropping off and purchasing items. If incorporating hazardous waste, reduced environmental harm from inappropriate storage/disposal.	Requires development of large number of resource recovery facilities. Builds Auckland's resilience by creating new infrastructure, and through strengthened relationships with the community. Opportunity to work with businesses wanting to recover materials for reuse/recycling/remanufacturing. If incorporating hazardous waste - H&S and HSNO operational requirements.	Insufficient market capacity and value for diverted materials. Difficulty in finding suitable sites. Not being able to adequately measure outcomes such as behaviour change, social cohesion etc. Establishing facilities quickly enough to meet community expectations.
1.4	**Support business to minimise waste, particularly in the**	Advocacy, facilitation role provided by council staff. Partner with relevant industry organisations to support business waste reduction.	Potentially significant especially with large scale developments and small sites.	Potential for circular economy/product stewardship approach. Applies principles of efficient use of materials,	Job creation arising from increased diversion.	Core concept of diversion from landfill. Beneficial reuse of materials cuts emissions associated with	Requires processing facilities to be developed. Requires markets to be further developed for	Lack of uptake/interest as requires additional time and resourcing. Mitigates reputational risk by Auckland Council

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/economic	Social/cultural	Environmental	Operational	Risk
	construction and demolition Industries	Incorporation of waste minimisation and elimination of problematic materials within council-led development/redevelopment projects. Development of case studies/track record. Involvement within research project and development of waste tools, education and resources for industry.	Potential reduction of 10 per cent of 600Kt by 2040.	with less wastage/improved value for money and productivity.	Creates opportunities for public involvement and education.	production of new products, and reduction of waste timber to landfill.	recycled/re-use products. Increased capture of recyclables may give operational efficiencies.	meeting commitments made under 2018 WMMP.
1.5	**Ensure households are able to dispose of household hazardous waste responsibly.**	Implementing the plan for hazardous household waste, including on-going data improvements: volumes and types of hazardous waste in homes across Auckland, volumes sold, volumes collected through program, volumes dumped, etc. Review and deliver opportunities to educate, lobby and otherwise improve current practices around product labelling, use, and disposal. Waste minimisation campaign to educate Aucklanders about alternatives to hazardous chemicals. Longer term advocacy for costs to be absorbed by a product stewardship scheme.	Not applicable (Evidence from Australian programmes indicate potential to increase to around 50 tonnes per year).	Potentially a high-cost system. Increased costs of disposal from greater capture of household hazardous wastes.	Reduced harm to waste handlers through improved management. Reduced harm to residents via increased collection/drop-off options (reducing quantities around home). Cultural benefit via improved capture and management of wastes with higher discharge and environmental harm risk. Communications and awareness accompanying new strategy and accompanying changes provide opportunity for public involvement and education.	Reduced harm through improved management.	Special provision for hazardous wastes needs be incorporated into facility design and operational controls Assumed that existing infrastructure has sufficient capacity for estimated capture rates of a new service. Special handling requirements, with associated training, certification and site controls. Current system is inefficient; assumed that improved household hazardous waste service will improve operational efficiencies for recycling and disposal.	Health and safety risk from use, handling, disposal of materials. Environmental risk from use and disposal of materials. Currently only low quantities received. Aim is to improve delivery of current options and to promote safe disposal methods. If highly effective, then potentially significant cost to deliver.
1.6	**Continue to focus on reducing waste in council offices and to quantify and set targets for operational wastes**	Within workplaces, involves continuing work to quantify operational waste streams across the council group in order to set baselines, together with setting targets for areas where significant waste minimisation and climate change opportunities exist.	Targets would be reset for 2024-2030 once baselines are established.	Scale of council waste tonnages may help develop/support diversion options for other materials. Economies of scale in operating across the council group are possible.	Increased engagement with staff across organisation and CCOs. Opportunities for council to support Māori outcomes through procurement for its own waste and mana whenua involvement in reviewing diversion opportunities and outcomes.	Reduces amount of waste filling landfills, and reduces associated methane and leachate discharges.	Requires ongoing support from top down.	Reaching targets for certain operational streams will be limited by viable alternatives to divert. In some cases, diversion may (currently) be more expensive than disposal to landfill.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/economic	Social/cultural	Environmental	Operational	Risk
1.7	**Strengthen process, practice and performance of council construction and demolition projects towards zero waste.**	System required to ensure consistent approach across construction and demolition projects undertaken across multiple parts of council. Would require: •methods to consider waste early when scoping and designing projects •provision of further guidance and tools, and opportunities to review plans, and share learnings and information •setting baselines and targets with transparent reporting on progress	Varying tonnages as depends on type of project, scale etc. Contracts to include measurement task for waste to landfill versus diversion.	In some cases, diversion may (currently) be more expensive than disposal to landfill, although economies of scale may reduce cost per tonne. Additional resourcing requirements to support widespread uptake across council – 0.5–1.0 FTE.	Aligned with council's vision Auckland as a world class city. Scale of council tonnages may help develop/support diversion options. Opportunities for community engagement on what council is doing and why. Driver for innovation.	Reduced waste to landfill. Potential to close the loop e.g. using council-generated waste concrete as aggregate, and reuse of materials where possible.	Template/s developed for site management plans, with ability to customise. Benefit from single point of internal review– to check, ensure consistency and make connections/ recommendations. Multiple parts of the council involved in these projects, with approach taken potentially varying across organisation.	Requires support from top down. Potential for high number, scale/cost and diversity of projects. Coordination required across council organisation. Co-ordination required across tendering, demolition and construction phase.
1.8	**Council events - expand and showcase zero waste operations at Auckland events including CCO venues and stadia.**	Supports Auckland's strategic vision and seeks to lead by example. Potential to generate/support diversion opportunities. Practical development of resources for zero waste events – potential for use of these tools by other organisations (tested and refined based on council events).	First need to establish baseline of total waste generated by the council/ CCOs. Target reductions to be established – e.g. 30 per cent overall reduction from baseline.	In some cases, diversion may (currently) be more expensive than disposal to landfill, although economies of scale may reduce cost per tonne. Generating new business opportunities – e.g. specialist event waste service providers	Increased engagement with staff across the council/CCOs. Potential for mana whenua involvement. Engage with the public and demonstrate range of options available. Demonstrated integrity from 'walking the talk'. Ability to test/refine approach to share with other non-council events. Educational opportunities and awareness raising. Partnership opportunities with community groups.	Reduced waste to landfill, and associated emissions. Increased diversion, and contribution to growth of those sectors. Planned delivery of waste and recycling services potentially reducing event litter.	Could apply red/amber/green traffic light approach, mapping activities/ initiatives over time. Potential synergies with other programmes e.g. Love Food Hate Waste.	Requires support from top down. Risk of increased cost and/or time to incorporate within event planning/ delivery.
1.9	**Continued advocacy for Waste Minimisation Act amendments to support a circular economy, increase in the waste levy, a beverage container return scheme and mandatory**	Continued focus on nationwide reform to support a circular economy including industry taking on responsibilities to reduce waste including mandatory product stewardship and a beverage container return scheme.	370,000 tonnes from waste levy rise.	Resourcing costs to form working group, attend meetings, prepare proposals etc. If successful, increased cost for disposal of	Collaborative approach to balance needs of different parties. Social/community benefit of increase diversion,	Further disincentive for landfill disposal, improving business case for increased range of diversion options.	Long-standing council support for increased liabilities.	Lack of support at central government level. Counter lobbying by others to prevent increased levy/ETS costs

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/economic	Social/cultural	Environmental	Operational	Risk
	product stewardship schemes.	Further increases to the waste levy would support reducing externalities of sending waste to disposal while increasing financial incentives for diversion. Would be supported by further research as required to identify the level of levy required to encourage diversion.		council-controlled wastes. SLR analysis indicates need for a $50 per tonne levy to achieve diversion of organic waste; and $120-$140 per tonne to achieve diversion of refuse. Potential increase in size of contestable waste levy fund and levy funds allocated back to councils. This will reduce as diversion options are further established.	driving innovation, job creation etc	Ultimate aim of reduced waste to landfill. Creates stronger driver for innovation through design/ approach (e.g. waste reduction upfront), diversion technologies and reuse/recycled market development. .	Consistent with original intent of waste levy and ETS legislation. Benefits of increased liabilities demonstrated by overseas experience.	- council's resources potentially more limited than those available to private sector groups not in support.

Table 30 Full implementation of 2018 WMMP plus extension into new priority waste streams and areas of advocacy

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
2.1 INCREASED ACTION TO MAXIMISE DIVERSION FROM OUR KERBSIDE WASTE								
2.1a	**INCREASE SUPPORT FOR AUCKLANDERS TO USE THE 3-BIN SYSTEM KERBSIDE TO MAXIMISE DIVERSION FROM LANDFILL** **Recycling contamination:** **Reduce contamination in kerbside recycling from over 21 per cent (current) to below 12 per cent (target).** **Education, community engagement and enforcement campaigns to get recycling right, reduce contamination in kerbside recycling targeting problematic items such as soft plastics, batteries/e-waste, food waste, nappies/medical waste and clothing/textiles.**	We have a mandate to deliver a Recycle Right behaviour change programme under Option 1: and a compliance and enforcement campaign is required to support the programme. This option addresses incidental contamination as well as individuals purposefully using the kerbside recycling container to dispose of excess refuse. This issue has been growing and will require dedicated resources to address. MRF contract requires incoming kerbside recycling to not exceed 12 per cent, otherwise loads rejected.	Saving more than 25,000 tonnes of waste annually sent to landfill via the MRF. Improving the quality of recyclable material and giving Council access to better commodity markets for its sorted materials.	Contamination in recycling costs more than $250,000 a month to dispose of contaminated material as refuse via the MRF. This cost will increase as the waste levy increases. Reducing contamination represents potential cost savings by avoiding costs relating to truck collections and MRF operations. Contamination also degrades the quality of good recyclable materials, and consequently the revenue derived from commodity markets. Adequate resource requirement for budget will be balanced by costs charged to council through additional contamination to carry out the coordinated investigation and removal of kerbside recycling bins to change behaviour from repeat offenders. Continue to advocate for CRS to progressively internalise the cost of recycling beverage containers from ratepayers to industry. Resource as appropriate to coordinate recycling contamination reduction activities, liaise with internal and external stakeholders. Invest in regular comms and engagement campaigns in partnership with MRF operator and wider national campaigns.	Behaviour change in recycling has been demonstrated to pave the way for increased interest in environmental issues and subsequent lifestyle changes. Support community understanding of the role of recycling within the waste hierarchy. Drive changes in consumption habits. Work with migrant communities (embedding pro-environmental behaviours on arrival to Tāmaki Makaurau Auckland).	Reduces waste to landfill. Greater efficiency of resource use/recovery. Reduce the miles travelled for waste to reach landfill because it will go direct instead of via the MRF.	Extra resource required for contracts and compliance staff in coordinating implementation and review of bin tagging and awareness programmes. Opportunity to build on national messaging which will be developed as part of standardising kerbside services. Reduced risk of injury and harm to collection contractors and MRF staff. Reduced trips to landfill via MRF. Significant cost saving to ratepayers from landfilling contaminated material, loss of revenue from poorer quality commodities and penalties paid.	Reputational risk depending on enforcement measures.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
2.1b	**SUPPORT WASTE MINIMISATION BEHAVIOUR FOR AUCKLAND'S INCREASINGLY DIVERSE POPULATION** **Develop a culturally appropriate approach which provides a special engagement focus around the wider use of council programmes, reflecting our culturally and linguistically diverse population.**	In the next 20 years, 20 per cent of Aucklanders will identify as Māori, and 40 per cent of Aucklanders will identify as South or East Asian. Mass council communications can struggle to reach diverse ethnic communities and placed based communities. Data from waste audits shows some groups who have not been exposed to the same level of messaging about recycling and waste minimisation may struggle to understand how to use kerbside services appropriately.	Varying.	Grow the network of support to linguistically and ethnically diverse communities through a larger pool of community partners.	Community partners through their online and in-person networks, engage diverse communities at the neighbourhood level. Community partners help to build prepared and resilient communities by fostering connections between neighbours, teaching composting, providing education on growing food and catalysing zero waste practices towards repair and re-use.	Opportunity to reduce waste from all of Auckland's diverse communities.	Extra resource required for developing engagement programmes and growing capacity of community partners.	For behaviour change to be effective, people must see and hear messages in multiple places (supported by key behavioural insights research).
2.1c	**ENSURE OUR SERVICES EVOLVE TO MEET THE NEEDS OF INTENSIFICATION** **Ensure Aucklanders living in multi-unit developments are given the same access to diversion and waste avoidance opportunities as other housing typologies through adequate provision at design stage.**	A growing proportion of Aucklanders are living in intensified housing typologies where there is less space available for separation of material streams. Interaction with planners and developers to influence at design stage for new homes to ensure we're setting ourselves up for the future. Providing services well with existing housing stock (council and private services). Behaviour change for MUD residents. Easy access to waste diversion infrastructure regardless of dwelling type is critical for diversion to occur. Consideration for allocation of space to enable reuse or sharing systems to occur.	Stronger planning rules in the Auckland Unitary Plan as well as equitable access to all waste diversion services could divert significant tonnages of reusable and recyclable material from landfill. The number/ proportion of Aucklanders living in MUDs is expected to grow based on consenting data that shows more applications for units that standalone homes.	The cost will be built into the cost of infrastructure development as it becomes a requirement under greener planning rules. Responsibility is given to developers via the consenting process to ensure future residents can meet their diversion obligations. Potential cost savings to multi-units who are reducing waste or diverting greater volumes once landfill levy increases further.	With awareness, future residents of new multi units can apply pressure on developers to improve design of waste and resource recovery infrastructure within a development. Improved behaviours and demand from residents of multi-unit developments to have equal access to diversion opportunities. Improved buy-in from developers to create diversion opportunities for residents. Decreased amenity for residents living in buildings that need more frequent collections due to lack of space for waste storage.	Reduce waste to landfill. Less contamination or missed capture. Lower emissions from reducing food waste to landfill. Inadequate space requires for waste and diversion requires more frequent collections and therefore more truck movements.	Properties are locked into service contracts that do not meet minimum diversion requirements. Loss of opportunity to reduce emissions through collection vehicle optimisation.	An increasing proportion of Auckland households do not have access to waste diversion services. Future properties are not fit for purpose.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
2.2 ACCELERATE OUR CONTRIBUTION TO AUCKLAND'S CLIMATE GOALS BY EXPANDING OUR PRIORITIES TO INCLUDE MORE WASTE STREAMS THAT HAVE HIGH CARBON EMISSIONS								
2.2b	**Resource research and behaviour change programmes aimed to build support for preserving resources and reducing excessive consumption of low quality, high turnover products.**	Brands will deliver what consumers want, so unless the consumer demand for better quality products such as clothing changes, the production of low-quality products will not change.	100,000 tonnes per annum in textiles alone.	Could be drawn from waste levy. Potential to share resources with other councils/MFE. Potential to build on work currently being undertaken by the Government who have introduced new legislation that requires organisations and businesses to be transparent about their operations and supply chains through a new public register under the Modern Slavery Supply Chain Reform.	Is an outcome with a very long-time horizon, needs a prolonged and consistent programme of engagement interventions in order to change people's buying habits. Low-cost products are not necessarily consumed by low-income Aucklanders, but middle-income Aucklanders with high consumption tastes.	Reduction in landfill emissions from organic waste breaking down in landfill. Reduction in emissions from unnecessary production of new materials for products.	Would see operational savings through a reduction in 5,000 tonnes of textile waste being processed through the MRF as contamination and landfilled.	Could be seen to be anti-growth by the business community; mitigated by focus on service economy for repair and repurposing products.
2.2b	**INCLUDE NAPPIES AND ADULT HYGIENCE PRODUCTS AS A PRIORITY WASTE STREAM** **Investigate options for diverting nappies and adult sanitary products from landfill, including ongoing support for waste avoidance, collection and processing**	Continue to provide support for waste avoidance through waste-free parenting programme. Investigate local collection/separation and processing options, taking into account experience overseas. Advocate for measures to support the design and environmental labelling of disposable nappies and adult hygiene products for promoting the production and consumption of product options leading to lower environmental impacts. Nappies and sanitary make up 12 per cent by weight of household waste in kerbside refuse and three per cent of total waste to landfill, second only to organic waste. With the removal of food scraps from kerbside refuse, nappies and sanitary will make up 20 per cent of the remaining waste. If all divertible material (compostables and recyclables) were removed, nappies and sanitary would make up almost a third (32 per cent) of the residual waste in kerbside refuse, making it the largest identifiable and ever-increasing category of household waste.	The waste reduction potential of diverting this waste stream is significant. Nappies and sanitary are estimated to reach 45,000 tonnes of waste to landfill by 2040.	Nappies and sanitary account for 28,607 tonnes from kerbside, which will cost ratepayers $1.4m in waste levy alone in FY 2023/24. This does not include collection and other disposal costs. Removing these products from the waste stream and processing for more beneficial use, has potential for cost saving as well as revenue generation from the sale of extracted plastic products for use in a variety of end markets.	By 2030 adult hygiene products are anticipated to outnumber nappies 10:1. And yet, adult incontinence is an extremely sensitive topic, making progress in this area difficult. Social stigma of putting out bin/bag containing hygiene product. Nappies and sanitary wastes make up a larger proportion of refuse bins in Manukau than central Auckland. This is likely due to the prevalence of larger households with multi-generational living in South Auckland, compared with central Auckland.	Life Cycle Assessments of nappies. Nappies and adult hygiene products. Potential to remove organic material from landfill, with benefits for reductions in carbon emissions from landfill gas. Potential to remove plastics and other chemicals used in nappies/AHPs.	Enabling the separation of nappies and adult hygiene products requires changes in operations – e.g. post collection sort, or introduction of separated collection. Alternative collection/separation and processing will require changes to existing infrastructure/ systems and may require significant lead-in time. (e.g. wash plants, packaging design/manufacturing changes).	Cost of processing options may be perceived as prohibitive. Topic is too sensitive to gain traction. Unsuccessful attempts in South Island may undermine confidence in ability of diversion to succeed.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
2.2c	**ACCELERATE ACTION ON PLASTIC PRODUCTS AND PACKAGING** **Investigate, facilitate, promote, and/or support initiatives that:** **a) reduce plastic usage;** **b) reduce plastic pollution;** **c) circulate plastic materials via recycling/recovery systems**	The action may involve targeting plastics managed via council-influenced services (inorganic collections, RRN network, or kerbside collections) or via council's own in-house operations/procurements. It may involve staff representation on external product stewardship industry groups; funding via WMIF for projects that target plastic prevention or reduction of plastic product/packaging types; or staff facilitating/brokering initiatives through community/business networks. Serves to support NZ's obligations to a Global Plastics Treaty (in development), and MfE's National Plastics Action Plan. Supports council's ACP targets and government regulations regarding product stewardship, including plastic packaging.	Variable but potentially significant. Plastics make up approximately 12 per cent of total waste to landfill, with plastic packaging representing the highest proportion of plastic usage.	Alternatives can be more expensive given lack of supporting infrastructure /economic systems, and scale. Alternatives can introduce other cost implications. Waste diversion avoids cost of disposal. Funding available via other external fund sources (Plastics Innovation Fund) and through producer responsibility/user-pay business models.	Supports innovation and partnerships across many potential sectors (C&D, hospitality, transport/logistics etc). Potential for mana whenua involvement. Ability to support other councils and wider national/global interests. Community engagement opportunities.	Potential to help reduce fossil fuel production – although awareness of transition shift from petroleum production to petrochemical/ plastic production. Reduce macro/microplastics entering the environment from wide range of sources.	Alternatives require changes to existing infrastructure/ systems and may require significant lead-in time. (e.g. wash plants, packaging design/manufacturing changes). Enabling the separation of specific plastic types/products requires changes in operations – equipment, labour, technology.	Risk that alternatives may not meet same specifications/ performance standards or create perverse outcomes. End-markets for diverted plastic materials are volatile and lack resilience.
2.3 EMPOWER AND EQUIP BUSINESSES TO MINIMISE WASTE FROM THEIR OPERATIONS, WITH A FOCUS ON PRIORITY WASTE STREAMS								
2.3a	**RECOGNISE AND SUPPORT BUSINESSES TO REALISE THE HUGE POTENTIAL OF RE-USE SYSTEMS TO ELIMINATE WASTE IN THE CIRCULAR ECONOMY** **Identify options where Council can support reuse of packaging in the Auckland economy as a way of reducing single use product packaging. This includes Business-to-Business and Business-to-Customer packaging.** **Advocate for central government policy action to level the playing field between reusable and single-use packaging.**	Adopting reuse systems requires a different way of thinking about resource recovery because reuse is about circulating products, not materials. It also involves promoting/removing barriers to different business models, rather than a focus on increasing waste diversion. Councils can do more to reduce the barriers to reusable packaging systems and be a louder and more supportive voice for reuse.	Based on B2B reuse systems adopted in Australia, more than 182,410 tonnes of avoided single use packaging per annum for Auckland. Zero Waste Europe estimates that a reuse economy could reduce waste generation by 30-50 per cent. Invest in methodologies for capturing data about waste avoidance through reuse strategies. Tell the story of waste avoidance.	Auckland Council can support the structural transition to a reuse model, for example by creating enabling environments for reuse-focused businesses to thrive, driving policy change, leveraging public procurement, and building out the necessary physical infrastructure. Actively encourage applications to the waste minimisation (WMIF) fund for reuse initiatives, and/or subsidise groups to trial reusable packaging systems. Walk the talk in council operations and procurement.	Auckland Council can take an active role in raising awareness about existing reusable packaging systems and reuse behaviour change. Work with other councils regionally and nationally to take a consistent approach to reusable packaging.	Clearly tell the story of waste avoidance and what that means for the environmental harms associated with single use packaging.	Auckland Council can lead in brokering collaboration or partner with businesses to deliver reuse systems.	Bring greater clarity and reassurance around the intersection between reusable packaging, food safety, infection control, and COVID19.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
2.4 SIGNIFICANTLY EXPAND AND ACCELERATE SUPPORT FOR CONSTRUCTION INDUSTRY TO MINIMISE WASTE TO LANDFILL								
2.4a	**Expand focus within Auckland Council Group to construction and demolition projects beyond pilot projects to strengthening processes, practice and performance towards zero waste including through implementing requirements for site management plans**	System required to ensure consistent approach across construction and demolition projects undertaken across multiple parts of council. Would require: • methods to consider waste early when scoping and designing projects • provision of further guidance and tools, and opportunities to review plans, and share learnings and information • setting baselines and targets with transparent reporting on progress.	Varying tonnages as depends on type of project, scale etc. Contracts to include measurement task for waste to landfill versus diversion.	In some cases, diversion may (currently) be more expensive than disposal to landfill, although economies of scale may reduce cost per tonne. Additional resourcing requirements to support wide-spread uptake across council – 0.5–1.0 FTE.	Aligned with the council's vision Auckland as a world class city. Scale of council tonnages may help develop/support diversion options. Opportunities for community engagement on what council is doing and why. Driver for innovation.	Reduced waste to landfill. Potential to close the loop e.g. using council-generated waste concrete as aggregate, and reuse of materials where possible.	Template/s developed for site management plans, with ability to customise. Benefit from single point of internal review– to check, ensure consistency and make connections/ recommendations. Multiple parts of the council involved in these projects, with approach taken potentially varying across organisation.	Requires support from top down. Potential for high number, scale/cost and diversity of projects. Coordination required across council organisation. Co-ordination required across tendering, demolition and construction phases.
2.4b	**Seek to implement requirement for Auckland (non-Council Group) infrastructure projects to include construction site waste management plans.**	Explore voluntary and statutory mechanisms to include the requirement for site waste management plan, for example via the Solid Waste Bylaw, or other existing mechanism. Criteria for scale/type of infrastructure project where this would be required would need to be developed in consultation with key stakeholders.	920,000 tonnes	Cost could be recovered through development fees. Good waste management should result in avoidance and minimisation of waste, resulting in materials cost savings and lower landfill fees.	Reinforcing need to take social and environmental impacts into account for large projects. Supporting innovation and growth of C&D diversion sector.	Reinforcing need to take social and environmental impacts into account for large projects, and not externalising the cost of construction to the environment.	Improved ability to foresee, divert and track wastes generated from infrastructure projects. May need to provide assistance upfront to develop plan, particularly to identify diversion opportunities. Monitoring/review requirements pre/during and post development.	Diversion opportunities may be limited for scale and type of waste e.g. for potentially contaminated fill from excavations.
2.5 ENSURE AUCKLAND'S WASTE INFRASTRUCTURE REMAINS RESILIENT IN THE FACE OF CLIMATE CHALLENGES								
2.5a	**Continue to investigate the resilience of waste infrastructure and services and our region's ability to adapt and respond during a crisis**	Building resilience into our planning and operational functions to address how waste is managed during such crises, and how our services can adapt to support community and infrastructural resilience is essential. This may include: the development and implementation of a Disaster Waste Strategy; continual review and implementation of council's Waste Asset Management Plan (AMP) and other key council AMPs that support waste minimisation and management services and activities; assessment of the role of the RRN and wider infrastructural services; review of collection contracts to consider how services can flex and adapt during a crisis; and continue to	May result in an increase of waste, although some diversion may be possible through the development of disaster waste plans/actions.	Cost to investigate/research may be nominal, but significant costs related to funding efforts required in a crisis. Certain costs may be required to be built into council contracts to address risks (e.g. insurances).	Addresses public health concerns and ensures access to essential services during a crisis. Seeks iwi/Māori involvement in disaster planning and response work. Community partners/sector help to	Likely to result in an increase of waste, although certain positive environmental outcomes can be enabled via council's planning functions (e.g. recovery of synthetic gases from appliances damaged in floods); recovery of spoil/soils	Helps to prepare council/iwi/contractors/wider sector's responses to manage wastes during a crisis.	Reactionary rather than implementing disaster waste/asset management tools/asset management plans and tools.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
		strengthen partnerships with iwi/Māori and key providers across the waste/ resource recovery sector to support community resilience.			develop planning tools to support how services could be provided during a crisis.	directed to cleanfill sites/not landfills.		
2.5b	**Continue to monitor and manage closed landfills and other contaminated land (on council land) to ensure risks are appropriately managed**	Auckland Council manages over 180 closed landfills across the region located on council land, as well as contaminated land at sites owned by the council. Numerous other closed landfill sites/contaminated land are located on private property which remain the responsibility of landowners. All sites are to be managed in accordance with regulatory requirements under the NBEA. The majority of the legacy landfill sites that the council manages have not been operating as landfills for decades, and a few are currently transitioning to becoming closed. The council will continue to review risks and prioritise work to make closed landfill sites safe (including risks linked to climate-change and sea level rise), based on risk assessments together with identifying and prioritising opportunities to remediate. A wider council approach for the management of contaminated land is an area requiring further work, including advocacy for updating national guidance and policy for contaminated land and issues associated with disposal of soils.	None: outcomes relate to waste management and avoidance	High costs to adapt or retrofit certain closed landfill sites to address identified risks/issues. Requires council staff resource to measure/monitor/report/ project manage. Harnessing landfill gas for energy may present an opportunity at certain sites	Where remediation or cultural monitoring can take place, this may align with mana whenua and iwi/Māori priorities. By managing health & safety and environmental risks well, certain closed landfill sites can provide high-value open spaces and add amenity value for Aucklanders	Mitigates environmental risks relating to exposure of waste from closed landfill sites from erosion/flooding etc, leachate discharges, and landfill gas/GHG emissions Contaminated land risks managed at council sites	Requirement to monitor, measure and report on region's GHG emissions as part of council's Te Tāruke a Tāwhiri commitments, other national policy directives Harnessing gas not feasible at most closed landfill sites	Limited external funding available Failure of closed landfill sites (due to impacts of climate-change or natural/human-made disasters) results in environmental harm/economic impacts from reactive clean-up efforts
2.6 ACCELERATE AND IMPLEMENT ACTIONS TO REDUCE AUCKLAND COUNCIL GROUP OPERATIONAL WASTE STREAMS								
2.6a	**Work across Auckland Council Group to institute waste plans at a CCO, department or building level including actions to contribute towards council targets for reducing in-house office wastes as those are introduced, as well as targeting specific CCO operational wastes such as biosolids, soils and C&D wastes.**	Requires actions to achieve waste minimisation amongst staff such as regular audits of relevant waste streams, setting in place new systems to support reduction, education and awareness raising; and transparent reporting on how staff or units are progressing towards the target.	First need to establish baselines for operational waste streams, initially focusing on priority waste streams and targets (refer Option 1).	In some cases, diversion may (currently) be more expensive than disposal to landfill, although economies of scale may reduce cost per tonne. Funding for ICT data portal solution including item on procurement checklists. Through council walking the talk, further economic benefits may be able to be leveraged across other sectors/industries.	Increased engagement with staff across organisation and CCOs. Demonstrated integrity from 'walking the talk'. Potential for measurement tools and training to be used by other organisations.	Reduced waste to landfill, and associated emissions (e.g. from food waste diversion). Increased diversion and contribution to growth of those sectors.	Scale of work due to the size of the organisation and diversity of council functions. Requires champions from different council teams/CCOs and capacity building of suppliers. Embed waste hierarchy at all stages of council group activity. Effective stakeholder engagement is key. Potential to build on other campaigns e.g. low carbon actions, health and wellbeing.	Requires support from top down (managerial buy-in). Requires ongoing motivation, support, resourcing etc. Waste minimisation objectives can compete with other social or economic drivers (e.g. least-cost procurement).

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
							Suite of options to be developed to suit activity type, specific constraints, pricing points etc. Aligns with Auckland's strategy direction set out in the Auckland Plan 2050 and Te-Tāruke-a-Tawhiri: Auckland's Climate Plan.	
2.6b	**Further embed waste avoidance and minimisation in council procurements, specifically focusing on activities generating high volumes of waste including organic waste.**	Lead example by adopting Auckland Council's sustainable procurement framework as an enabler for generating positive outcomes that can deliver an improved quality of life, both now, and for future generations. Addresses potential for waste reduction created by the size and scale of Auckland Council and its associated organisations. Potential to generate/ support diversion opportunities including in significant waste streams such as construction and demolition waste and organics which impact on climate change. Practical development of effective communication and engagement strategies, resources – potential for use by other organisations. Investigate alternatives to problematic building materials (e.g. polystyrene and treated timber) in Auckland Council's physical works projects. Utilise Waste Licensing system within Council procurement process.	Varying tonnages as depends on type of procurement, scale etc. Physical works contracts to include measurement task for waste to landfill versus diverted. Council suppliers embed waste minimisation as part of their approach for use with other (non-council) customers.	Perceived vs. actual cost implications. In some cases, diversion may (currently) be more expensive than disposal to landfill.	More holistic, community driven approach to council procurement and decision-making. Demonstrated integrity from 'walking the talk'. Ability to test/refine approach to share with other non-council organisations.	Environmental externalities more effectively built into procurement decisions.	Suite of options to be developed to suit procurement type, specific constraints, pricing points etc.	Requires support from top down. Actual/perceived impact on suppliers to meet procurement requirements. Smaller suppliers may require support to demonstrate ability to meet these requirements.
2.7 BROADEN ADVOCACY TO CENTRAL GOVERNMENT FOR TIMELY DELIVERY OF THE STATUTORY AND POLICY FRAMEWORK THAT WILL ENABLE THE SHIFT TO A CIRCULAR ECONOMY								
2.7a	**STRENGTHEN ADVOCACY FOR SYSTEMS THAT WILL FACILITATE WASTE AVOIDANCE** **Advocate for timely delivery of the goals and targets of the New Zealand Waste Strategy while extending advocacy for further**	The government has released a new NZ Waste Strategy supported by legislation to strengthen a circular economy. However, the introduction of greater regulatory interventions would improve the alignment of New Zealand with other jurisdictions where there are stronger restrictions; preventing New Zealand from becoming a dumping ground for products that no longer meet the environmental performance requirements of other jurisdictions.	Fewer resources are used and products and services are redesigned to avoid waste being produced. Products stay in use for as long as possible without	Support Auckland businesses wanting to move to more circular products, skills, technology, and services through investment in innovation e.g. WMIF grant, collaboration with Tātaki Auckland Unlimited etc. Help businesses see circular economy approaches as a	Will address market failures which contribute to unsustainable consumption and production patterns. Will improve product quality and therefore equity for Auckland's lowest income households who	Reduced impacts from extraction of virgin materials and reduce consumption-based emissions.	Most effective if implemented nationally and legislated. Need to align new recycling contracts post-CRS introduction. Increased capture of recyclables offers potential for increased operational	Impact on kerbside collection service via reduced tonnage. Central government will not legislate. Strong opposition from some sectors. Mitigates reputational risk by Auckland Council

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
	regulatory settings that will drive waste avoidance, circularity of resources, and lower emissions across supply chains	Further tools beyond those in Option 1 are needed. For example, right to repair legislation, mandatory site waste management plans for large construction or demolition projects, national-led behaviour change programmes and stronger enforcement powers to address litter and illegal dumping, landfill bans, and systems to track and trace waste, particular hazardous waste.	significant reprocessing. Data demonstrating greater diversion and reuse of materials, tracked through enhanced reporting requirements.	business opportunity, rather than a cost. New infrastructure and/or compliance/enforcement requirements can add additional costs. Through EPR, externalised costs can be redirected to target those that produce and consume products. Cost savings from reduced litter/illegal dumping, disposal costs, reducing insurance risks of fires from battery wastes.	produce more waste, simply because they cannot currently afford durable, quality products (common with furniture and electronics).		efficiencies and driver for innovation. Implications for Council procurement and supplier contracts.	meeting commitments made under 2012 and 2018 WMMP.
2.7b	**Advocate for laws that require products to last longer and be easier to repair.** **Collaboration with repair organisations to support Aucklanders to keep products in use for longer.**	Right to Repair and durability legislation is particularly important in the area of electronic consumer goods, due to the vast amounts of e-waste discarded each year, and the precious resources, and hazardous chemicals contained within them. Achieving good outcomes for repair requires changes to education, to consumer law, copyright law and waste minimisation law.	2020 Estimations are that more than 97 kt of e-waste are being disposed of as landfill each year with more than 98.2 per cent of generated household e-waste ending up in landfills[71]. Much of this is unnecessarily created through poor quality manufacturing leading to product failure and planned obsolescence. Better data gained through repair cafes on the products that are repairable	Advocating for targeted waste levy funding, subsidies for repair, providing free or low-cost physical spaces in cities and towns for repair hubs, and making sure that product stewardship schemes cover the costs of repair, as well as recycling.	Circular product design and repair across the education sector, can ensure students are learning skills and mindsets to create sustainable technologies. Changes to laws would ensure that spare parts are made available, that independent repairers have access to the tools and information they need to fix broken items, creating new sustainable employment opportunities. Ensure consumers have access to information on product repairability and durability when purchasing products in Aotearoa.	Better requirements for repair and durability will significantly reduce tonnages of e-waste to landfill. The State of Victoria In Australia has had a ban on e-waste to landfill since 2019, and the Australian Government requires the television and computer industries to fund collection and recycling of a proportion of the televisions and computers disposed of in Australia each year.		

[71] https://ewastemonitor.info/wp-content/uploads/2020/11/GEM_2020_def_july1_low.pdf

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
			which can be used to inform customer purchasing decisions longer term.		Advocating for labelling or certification to be displayed on key products, such as electronics, furniture and textiles, so consumers know how long a particular product is expected to last. Great way for communities to connect build resilience and network around repair skills.			
2.7c	**ADVOCATE FOR THE DEVELOPMENT OF A FRAMEWORK TO REDUCE THE UNNECESSARY LOSS OF SURPLUS SOIL FROM CONSTRUCTION ACTIVITIES INTO LANDFILL, CLEANFILL AND MANAGED FILL** **Improve data and identification of different waste soil categories and their fate.**	Soil is one of the largest single streams of waste to landfill, cleanfill or managed fill, thought to be as much as 40 per cent or 600,000 tonnes per annum. Much of this soil is not contaminated and does not need to be discarded. Once lost, it cannot be retrieved. Data and records by developers, councils and receiving sites continues to be limited, however greenfield residential sub-divisions, followed by brown-field residential developments are the primary source of surplus soils.	More than 400,000 tonnes per annum beneficially reused or retained on site rather than being removed from site to landfill, cleanfill or managed fill.	Developer decisions to reuse soils carries little economic incentive compared to other solutions (although landfilling costs are expected to shift this). Consideration needs to be given to the pricing structure of the landfill levy, cleanfill and managed fill pricing versus approaches that enable more sustainable alternatives such as retaining on site.	Risk aversion from developers associated with leaving potentially contaminated soils on site which could be recorded on the Land Information Memorandum (LIM), yet the contaminant status of the bulk of soil disposed to landfills may have contaminant concentrations above background concentrations but below applicable soil contaminant standards for the protection of human health. Māori have strong stories of inter-connection and inter-dependency with soils and ecosystems. In Te Ao Māori all soils have a whakapapa that connects humans, terrestrial biota (soil microbes, invertebrates, plants,	Reduce emissions associated with transporting surplus soil, particularly when soils are removed to Class 3 or 4 landfills because of the longer average trucking distances. Soils influence climate resilience and host around a quarter of the planet's biodiversity. Many of our soil organisms are unique to New Zealand. Within urban areas, permeable greenspaces have an important role in carbon storage, mitigating stormwater runoff (aligning with council's Making Space for Water programme) and	Implications for the consenting of new developments. Implications for waste licensing and reporting requirements of waste transporters to Auckland Council.	Environmental/human health factors are not adequately addressed

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
					wildlife, and livestock) to location, soil and natural environments. Māori would like to minimise the transportation of soils off-site, and those classified as surplus, to enact a healing process for soils with elevated levels of contaminants and trace elements on-site as a preferred option.	reducing peak temperatures. The New Zealand Waste Strategy is arguably the strongest existing driver for the reuse of surplus soils.		
2.7d	**STRENGTHEN ADVOCACY FOR FRAMEWORKS TO ADDRESS WASTES WITH HIGH EMISSIONS AND HIGH ENVIRONMENTAL HARM POTENTIAL** **Advocate for cross-government changes to economic policy that will support circularity, waste avoidance, and lower emissions across supply chains (e.g. economic incentives, taxation etc.)**	Meeting emissions budgets and targets will require changes to the economy and the way goods and services are imported, exported, bought and sold. It will involve rethinking and redesigning how we produce and consume goods and services to design out waste and pollution and achieve equitable outcomes. Promising first steps being taken across the public and private sector to move to a circular economy include Kainga Ora's commitment to deconstruction, and initiatives such as Xlabs set up to help businesses to improve the circularity of their business models. The 2023 Global Circularity Gap Report states in 2018, 9.1 per cent of the world's resources were cycled back into the economy. That figure has dropped to 7.2 per cent in 20231. The intention was for businesses to also produce waste plans – this could be advocated for to address 80 per cent of waste to landfill not under direct council control. Work with mana whenua to strengthen our input into government policy.	Auckland has estimated that it could be $6-$8 billion better off, with much lower carbon emissions by 2030 with a transition to zero waste and circular economy models. Increase the proportion of goods in the Auckland economy that qualify as circular based on the Ellen Macarthur Foundation's definition.	Economic co-benefits of a circular economy include substantial net material savings, mitigation of price volatility and supply risks, innovation and job creation. Council is already contributing to the key starting point of the circular economy, which is understanding how materials circulate through sectors in the economy, gathering data and developing resource flow maps across sectors and systems (clothing/textiles and food). Increased cost of landfilling most likely to be passed onto waste producers. Economic risks redistributed e.g. higher disposal cost leading to reduced landfill income but higher recycling/diversion income. Business waste plans would create new sector/commercial opportunities.	Circular economy approaches will accelerate high wage jobs, and new economic opportunities. Transitioning to a circular economy means moving from an extractive economic model to one that is regenerative, just, and inclusive. Enable iwi/Māori, who have commercial and cultural interest in a regenerative economy, to participate in and benefit economically from emerging circular solutions. Increased cost passed onto waste producers. Job and industry creation arising from increased diversion opportunities. Strengthen relationships with mana whenua, and further	Nature supports human wellbeing as well as economic activity. Growing the bioeconomy and nature-based solutions that can replace synthetic and fossil fuel-derived products to support environmental regeneration. Core concept of diversion from landfill. Beneficial reuse of materials cuts emissions associated with production of new products.	Most effective if implemented at national level and legislated. Increased capture of recyclables offers potential for increased operational efficiencies and driver for innovation.	Central government may not legislate. Private sector may not support. Continued work will mitigate reputational risk by Auckland Council meeting commitments made under 2012 and 2018 WMMP.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
					embed Te Ao Māori into waste minimisation.			
2.7e	**ADVOCATE FOR A CO-ORDINATED NATIONAL FRAMEWORK TO ENABLE GREATER TRANSPARENCY OF HAZARDOUS WASTE DISPOSAL** **Expand focus around household hazardous waste to include commercial hazardous waste-generating activities and management pathways in Auckland.**	There remains no overarching legislation governing management of hazardous waste in New Zealand. The OECD recognised in an environmental performance review of New Zealand's management of chemical waste in 2007 that hazardous waste tracking is managed by an incoherent and fragmented framework of responsibilities shared between local government, and several government agencies including EPA and WorkSafe. In the absence of strong legislation there is a lack of national oversight and enforcement ensuring chemical wastes being generated in an industrial setting are collected, treated and disposed of safely.	None: outcomes relate to waste treatment/ management	Hazardous waste is often the by-product of industrial activities. The cost of treatment and disposal can be high, leading to perverse outcomes such as abandoning sites with chemicals still on them. Overlapping roles between industry, council and government means there is potential for monitoring for environmental harms to fall through the cracks.	The Auckland community expect Auckland Council and the New Zealand Government to be protecting them and future generations from the risks associated with hazardous waste.	A waste is considered hazardous if it presents some degree of chemical, physical or biological hazard to people or the environment. It is not always safe to dispose of hazardous waste to landfill without some form of prior treatment as hazardous waste can continue to cause environmental harm from within a landfill, (eg. fires, leaching etc).	Strong national direction through regulation, with targeted compliance and enforcement will manage the risks more effectively than policy in the form of strategies and guidelines.	Contaminants from hazardous wastes that enter land, air, water create potentially significant and/or ongoing risks.
2.8 PREPARING / PAVING THE WAY FOR BEYOND 2030								
2.8a	**INVESTIGATE THE POTENTIAL ROLE OF EMERGING TECHNOLOGIES TO FACILITATE WASTE AVOIDANCE AND MINIMISATION** **Examples include:** **- using Artificial Intelligence for mixed waste sorting infrastructure** **- RFID to enable rebates for low waste producers**	Keep abreast of developments in AI technology and alternative sorting infrastructure to separate specific waste streams along a 'dry' single sort line (from both MSW and inorganic kerbside collections) as onshore processing capacity is expanded. Investigate the value / potential of applying and installing this technology at the WRTS.	With organic material removed from MSW, opportunities such as dry sort lines in a 'dirty MRF' to separate specific significant waste streams to be sorted post kerbside collection and diverted from landfill.	Capital and operational costs will be established through investigations. Reduced tonnages to landfill will savings in waste levy.	Reduced impact on amenity by avoiding need for additional collection vehicles. Reduced 'clutter' on kerbside / social stigma of putting out bin/bag containing hygiene product.	Avoids need for additional collection vehicles on the road.	No additional collection fleet/infrastructure required. Reduced 'clutter' on kerbside / social stigma of putting out bin/bag containing hygiene product	Cost of investment. Lack of willingness to invest in technology to enable this.
2.8b	**IMPACT OF CHANGES IN INTERNATIONAL LEGISLATION AND**	In recent years, council has led and contributed to research on significant waste topics that help inform regional and national decision-making (e.g onshore recycling, CRS, waste	Potentially significant but will vary	Requires dedicated funding to undertake research and council staff resource.	Research would include the consideration of social, cultural impacts	Potentially significant, via waste reduction outcomes,	Research can help to develop relationships and collaborative opportunities	Research outcomes are not representative of or are challenged by certain

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
	POLICY FRAMEWORKS (EG DIGITAL PRODUCT PASSPORTS ETC) **Undertake research on emerging waste topics, and priority wastes, which can be relied upon to inform evidence-based decision-making**	levy, priority wastes such as C&D, plastics, and organics). This option seeks to enable the role council has as a promotor and facilitator of waste minimisation action across the sector. Topics of research can include: measurement of waste-related carbon emissions; impacts of waste levy and other national policy instruments; behaviour change interventions; waste to energy technologies; recycling markets; reuse systems; as well as continuing to identify and assess priority waste streams including paper/cardboard, C&D, textiles, organics, priority products as per the WMA 2008, and hazardous wastes.	depending on outcomes of research and any implementation programmes.	Requires capacity from specific industry/community organisations who holds information of interest.	of specific waste interventions (e.g. Māori outcomes; how council services provide for equitable outcomes - low-waste producing households; large households; ethnic communities etc). For certain research topics suppliers may be engaged who can access and represent the views of specific industries/ communities/sectors.	but will vary depending on outcomes of research and implementation.	between council's community partners and industry sectors.	groups/sectors, and limited by access to information and data. Research outcomes are not implemented due to policy, cost, resourcing constraints
2.8c	**IMPLEMENT BIOSOLIDS STRATEGY** **Explore opportunities to optimise resource recovery options for biosolids, in collaboration with Watercare, iwi/Māori, and key stakeholders.**	Watercare's current Biosolids Strategy draws on extensive knowledge of best practice biosolids management alongside local considerations. Over the term of this WMMP, it is critical that options to address the fate of biosolids from the Mangere WWTP are explored in greater detail given the current use of biosolids at Puketutu Island is scheduled to be completed in early 2030s. From the early 2030s, if disposed to landfill these biosolids will represent one of the largest waste streams generated from a single source in Tāmaki and require significant landfill space and specialised operational handling. Currently there is no workable regulatory framework to enable biosolids to be returned to land. Options need to be designed in collaboration with mana whenua as key partners.	200,000 tonnes per annum from early 2030s	Depending on the pathways explored there will be significant capital and/or ongoing operating costs required from the early 2030s.	The sensitivity of the receiving environment that may receive biosolids (landfill, land, air via incineration) goes beyond bio-physical matters, and can include specific cultural considerations, consideration of proximity of neighbours/dwellings, the presence of 'sensitive areas', as well as existing public use and access issues. Watercare's operations and future planning decisions require maintaining key relationships with iwi/Māori. Meaningful engagement is required with mana whenua to reach solutions that achieve outcomes required.	Explore options that seek to reduce biosolid quantities, as well as maximise carbon removal from the organic material during wastewater treatment prior to disposal/resource recovery (e.g. via digestion and thermal hydrolysis processes for biosolids). This increases the beneficial capture of methane for energy recovery to reduce landfill emissions. Additionally, the application of organic materials from biosolids to land can increase carbon sequestration by returning carbon to	Investigate wastewater treatment technology that reduces the volume of biosolids created (eg Thermal Hydrolysis), and other operational efficiencies that may be gained through wider collaboration with Council Group and community partners.	Range of risks – including environmental, public health, financial, and operational - depending on the pathways being explored.

Proposed option/action		Description	Issues and considerations/pros and cons					
			Waste reduction potential (by 2040)	Cost/funding/ economic	Social/cultural	Environmental	Operational	Risk
						NZ's carbon depleted soils.		

8.4.1 Scoring of proposed options

The criteria applied within Table 32 are based on the criteria used in the 2018 WMMP which were, in part, derived from criteria established (and weighted) for the council's Waste Minimisation and Innovation Fund. Changes from 2018 criteria include:

- Māori outcomes have been assessed as a stand-alone criteria, instead of being split between Environmental benefits and Social/Cultural benefits.
- Extension of "user-pays" philosophy to include importance of recognising the true cost of an activity
- Increased producer and procurer responsibility in achieving a circular economy

Individual actions have been assessed in terms of alignment with relevant objectives and targets. The following notation is used for those objectives and targets.

Waste objectives (WO)

- WO1: Organisations and individuals take responsibility for keeping resources, products and belongings in use as long as possible, and reducing their waste footprint.
- WO2: Organic waste is diverted from landfill.
- WO3: We have a well-supported, accessible network of infrastructure across the region to support resource recovery and deliver on community and Māori outcomes.
- WO4: We have robust data and information to target our efforts to minimise waste while protecting the environment, and safeguarding health and wellbeing.
- WO5: Our total waste volumes are reduced sufficiently so that the need for final disposal is minimised.
- WO6: People treasure and respect the environment with less litter and dumping.
- WO7: In times of disaster, all sectors work together to keep communities safe from contaminated waste while supporting needs for replacement goods and diverting waste where possible.
- WO8: Harmful waste is avoided, and residual waste is treated to prevent harm to health and wellbeing and to the environment.

Targets (WT)

- WT1: reduce office waste by 50 per cent from 0.14kg per visit to 0.07kg by 2030 (from 2022 baseline data).
- WT2: reduce domestic kerbside refuse from a 2022 baseline of 141 kg to 120 kg per capita per year by 2028 (A reduction of 15 per cent).
- WT3: further reduce domestic kerbside refuse from 120 kg to 100 kg per capita per year (a 17 per cent reduction) by 2030.
- WT4: reduce total council- and private-sector-influenced waste to landfill by 30 per cent from a 2022 baseline of 873kg per capita per year, by 2030.

- WT5: reduce the tonnage of organics (paper, garden, food) by 100 per cent for food and garden waste, and 50 per cent for paper by 2030, to achieve emissions reductions targets (biogenic methane) from landfill as outlined in the New Zealand Emissions Reduction Plan.

For actions based on Auckland Council taking on an advocacy role, the scoring is based on an underlying assumption that advocacy will achieve the desired outcome. Although this is not guaranteed, a belief in the ability to influence and bring about positive change is considered an important part of choosing to advocate.

Multiple criteria have been used to assess each of the proposed options and underlying actions, and a scoring system has been applied, as detailed in Table 31.

Table 31 Multi-criteria scoring system

Primary criteria	Secondary criteria	Legislative/strategic drivers	Weighting
Environmental benefits **(Total weighting 20%)**	I. Maximise landfill diversion	• New waste legislation72 • New Zealand Waste Strategy 2023 • Auckland Waste Minimisation and Management Plan 2018 • Auckland Plan 2016 • Auckland Unitary Plan • Waste Management and Minimisation Bylaw 2019	5%
	II. Minimise harmful effects of waste on - Freshwater Coastal and marine environment Soil Stormwater Domestic air quality	• Hazardous Substances and New Organisms Act 1996 (HSNO) • Health and Safety at Work (Hazardous Substances) Regulations 2015 • WMMP 2018 • Health Act 1956 • Resource Management Act 1991 (RMA) • Waste Management and Minimisation Bylaw 2019 • Auckland Unitary Plan	5%
	III. Waste avoidance, reduced consumption and circular economy outcomes including	• Proposed MBIE Circular Economy Strategy • NZWS 2023 • WMMP 2018 • Waste Management and Minimisation Bylaw 2019	5%

[72] At the time of writing, the Waste Minimisation Act 2008 and the Litter Act 1979 are planned to be repealed and replaced with new legislation termed 'Responsibility for Reducing Waste Act' referred to as “New waste legislation” throughout this chapter. Refer Chapter 2.2.3 for further details.

Primary criteria	Secondary criteria	Legislative/strategic drivers	Weighting
	improved efficiency of resource use	• Auckland Climate Plan • Sustainable Procurement Framework	
	IV. Reduce greenhouse gas emissions	• Climate Change Response (Emissions Trading) Amendment Act 2008 (CCRA) • National Emissions Reduction Plan • New Zealand Waste Strategy 2023 • Proposed MBIE Circular Economy Strategy • Auckland Plan 2050 • Auckland Climate Plan • Auckland Unitary Plan • Sustainable Procurement Framework	5%
Māori outcomes **(Total weighting 10%)**	I. Mana whenua outcomes	• Kia Ora Tāmaki Makaurau • Schedule of Issues of Significance to Māori in Tāmaki Makaurau 2021-2025 • Māori Plan 2017 • Auckland Plan 2050 • Sustainable Procurement Framework	5%
	II. Mataawaka outcomes	• Kia Ora Tāmaki Makaurau • Schedule of Issues of Significance to Māori in Tāmaki Makaurau 2021-2025 • Māori Plan 2017 • Auckland Plan 2050 • Sustainable Procurement Framework	5%
Social, and cultural benefits **(Total weighting 20%)**	I. Maximise local economic and social development opportunities e.g. job creation	• WMMP 2050 • Auckland Plan 2050 • The Thriving Communities Strategy Ngā Hapori Momoho • Local board plans • Sustainable Procurement Framework	5%
	II. Resilient communities (including climate resilience) with equitable access to services	• The Thriving Communities Strategy Ngā Hapori Momoho	5%
	III. Reducing litter and illegal dumping	• WMA 2008 and Litter Act 1979 (and proposed legislation reform) • WMMP 2018	5%

Primary criteria	Secondary criteria	Legislative/strategic drivers	Weighting
		• Waste Management and Minimisation Bylaw 2019 • Local board plans	
	IV. Opportunities for community involvement and education	• WMMP 2018 • The Thriving Communities Strategy Ngā Hapori Momoho • Local board plans	5%
Operational benefits **(Total weighting 15%)**	I. Achieve operational efficiencies in waste and recycling services	• WMMP 2018 • Local Government Act 2002 (Local Government Act 2002) and amendments • Waste Management Act 2008 (s.42) • NZWS 2023 • Waste Management and Minimisation Bylaw 2019 • Health Act 1956 • Long Term Plan	5%
	II. Development of systems and infrastructure and processes to maximise resource recovery	• WMMP 2018 • Auckland Plan 2050, Long Term Plan • Local board plans • Proposed national Action and Investment Plans • National and local Infrastructure Strategy	5%
	III. Increased 'producer' and procurer responsibility to achieve a circular economy.	• NZ Waste Strategy 2023 • WMMP 2018 • Proposed MBIE Circular Economy Strategy • WMA 2008 and Litter Act 1979 (and proposed legislation reform)	5%
Economic benefits **(Total weighting 20%)**	I. Value for money to householder/ratepayer, through efficient and effective procurement	• Local Government Act 2002 • WMA 2008 and Litter Act 1979 (and proposed legislation reform) • WMMP 2018 • Auckland Plan 2050, Long Term Plan • Sustainable Procurement Framework	4%
	II. Apportioning true costs appropriately (eg. Not externalising costs)	• WMA 2008 and Litter Act 1979 (and proposed legislation reform) • WMMP 2018	4%

Primary criteria	Secondary criteria	Legislative/strategic drivers	Weighting
		• Waste Management and Minimisation Bylaw 2019 • Sustainable Procurement Framework • The Thriving Communities Strategy Ngā Hapori Momoho	
	III. Growth of existing and new reuse and resource recovery sector	• Proposed national Action and Investment Plans • Auckland Plan 2050, Long Term Plan • Local and national Infrastructure Strategy • WMMP 2018, Revised Resource Recovery Strategy 2021 • Some local board plans	4%
	IV. Economic benefits accrued to local economy	• Auckland Council Future Development Strategy • Some local board plans	4%
	V. Minimise traffic congestion and transport related emissions.	• Auckland Unitary Plan • Sustainable Transport Plan • Auckland Plan 2050 • Auckland Unitary Plan • Waste Management and Minimisation Bylaw 2019 • Auckland Climate Plan	4%
Risk mitigation and management **(Total weighting 15%)**	I. Reduce legislative risk (to Auckland Council)	• WMA 2008 and Litter Act 1979 (and proposed legislation reform) • HSNO • Local Government Act 2002 • RMA 1991 • Health Act 1956 • Health and Safety at Work Act 2015	5%
	II. Reduce reputational risk (to Auckland Council)	• n/a	5%
	III. Reduce economic risk (to both Auckland Council and to the community)	• n/a	5%

Table 32 Multi – criteria assessment of options

No	Description	Relevant Waste Objectives and Targets		Assessment criteria																				
		Objectives	Targets	Environmental benefits				Māori Outcomes		Social & cultural benefits				Operational benefits			Economic benefits					Deliverability and risk			Total score
Score				20%				10%		20%				15%			20%					15%			100%
Secondary score				5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5	5	5	100
Secondary Criteria No.				I	II	III	IV	I	II	I	II	IV	V	I	II	III	I	II	III	IV	V	I	II	III	
Option 1: Status quo - Full implementation of 2018 WMMP																									
1.1	Standardise three bin service for domestic customers with future move to fortnightly refuse.	WO3	WT2,3	1		1	1		1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	80
1.2	Introduce a domestic kerbside food waste collection for areas outside the mainland urban collection area.	WO2	WT2,3,5	1		1	1	1	1	1	1		1		1			1	1	1		1		1	57
1.3	Expansion of the Resource Recovery Network (RRN)	WO3	WT4	1	1	1	1	1	1	1	1	1	1	1	1			1	1	1			1		67
1.4	Support business to minimise waste, particularly in the construction and demolition Industries	WO5	WT4,5	1	1	1	1			1		1	1		1	1		1	1	1				1	62
1.5	Ensure households are able to dispose of household hazardous waste responsibly.	WO6, WO8			1	1	1	1	1		1	1	1	1	1		1		1			1	1	1	63
1.6	Continue programme of reducing waste in council offices and set targets for operational wastes.	WO1	WT1	1		1	1			1			1	1	1	1	1		1	1			1	1	62
1.7	Strengthen process, practice and performance of council construction and demolition projects towards zero waste.	WO3, WO5	WT4	1	1	1	1			1			1	1	1	1	1		1	1		1	1	1	72
1.8	Council events - expand and showcase zero waste operations at Auckland events including CCO venues and stadia.	WO1	WT4	1	1	1	1			1		1	1	1	1	1		1	1	1			1		67
Option 2																									
2.1	**INCREASED ACTION TO MAXIMISE DIVERSION FROM OUR KERBSIDE WASTE**																								
2.1a	Deliver education, engagement and enforcement to drive changes in diversion behaviour, reduce contamination in kerbside recycling	WO3, WO6	WT2,3	1		1			1	1	1	1	1	1			1		1	1			1	1	57
2.1b	Develop s a targeted engagement approach to reflect our culturally and linguistically diverse population.	WO3, WO6	WT2,3	1	1	1	1	1	1	1	1	1	1	1			1		1	1			1		62
2.1c	Ensure Aucklanders living in multi unit developments are given the same access to diversion and waste avoidance opportunities as other housing typologies.	WO3, WO6	WT2,3	1			1				1	1	1	1	1			1			1	1	1	1	58
2.2	**ACCELERATE OUR CONTRIBUTION TO AUCKLAND'S CLIMATE GOALS BY EXPANDING OUR PRIORITIES TO INCLUDE MORE WASTE STREAMS THAT HAVE HIGH CARBON EMISSIONS**																								
2.2a	Resource research and behaviour change programmes aimed to build support for preserving resources and reducing excessive consumption of low quality, high turnover products/packaging.	WO4		1	1	1	1		1	1	1	1	1		1	1		1	1	1					62

No	Description	Relevant Waste Objectives and Targets		Assessment criteria																					
		Objectives	Targets	Environmental benefits				Māori Outcomes		Social & cultural benefits				Operational benefits			Economic benefits					Deliverability and risk			Total score
Score				20%				10%		20%				15%			20%					15%			100%
Secondary score				5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5	5	5	100
Secondary Criteria No.				I	II	III	IV	I	II	I	II	IV	V	I	II	III	I	II	III	IV	V	I	II	III	
2.2b	Investigate options for diverting nappies and adult sanitary products from landfill including ongoing support for waste avoidance, collection and processing.	WO5, WO2	WT5	1	1	1	1	1	1	1		1	1		1			1	1	1					52
2.2c	Investigate, facilitate, promote, and/or support initiatives that: a) reduce plastic usage; b) reduce plastic pollution; c) circulate plastic materials via recycling/recovery systems	WO5, WO6, WO8	WT4	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1			1	1	77
2.3	**EMPOWER AND EQUIP BUSINESS TO MINIMISE WASTE FROM THEIR OPERATIONS WITH A FOCUS ON PRIORITY WASTE STREAMS**																								
2.3a	Identify and implement options where Council can support reusable products/packaging systems in the Auckland economy as a way to reduce single use products/packaging.	WO1	WT4	1	1	1	1	1	1	1	1	1	1		1	1		1	1	1					62
2.4	**SIGNIFICANTLY EXPAND AND ACCELERATE SUPPORT FOR THE CONSTRUCTION INDUSTRY TO MINIMISE WASTE TO LANDFILL**																								
2.4a	Expand focus within Auckland Council Group to construction and demolition projects beyond pilot projects to strengthening processes, practice and performance towards zero waste.	WO5, WO2	WT4,5	1	1	1	1	1	1	1			1	1	1	1	1	1	1	1			1		66
2.4b	Seek to implement requirement for Auckland (non-Council Group) large infrastructure projects over a given scale to include construction site waste management plans.	WO5, WO2	WT4,5	1	1	1	1	1	1	1		1	1		1	1		1	1	1					57
2.5	**ENSURE AUCKLAND'S WASTE INFRASTRUCTURE REMAINS RESILIENT IN THE FACE OF CLIMATE CHALLENGES**																								
2.5a	Continue to investigate the resilience of waste infrastructure and services during a crisis and our region's ability to respond.	WO7		1	1		1	1	1		1	1	1	1	1		1					1	1		54
2.5b	Continue to monitor and manage closed landfills and other contaminated land (on council land) to ensure risks are appropriately managed.	WO8			1			1	1		1						1					1	1	1	29
2.6	**INCREASED FOCUS (ACCELERATE AND IMPLEMENT ACTIONS) ON AUCKLAND COUNCIL GROUP OPERATIONAL WASTE STREAMS**																								
2.6a	Work across Auckland Council Group to institute waste plans at a CCO, department or building level including actions to contribute towards council targets for reducing in-house office l wastes as those are introduced.	WO5	WT1	1		1	1		1	1			1	1	1	1	1		1	1			1	1	62
2.6b	Further embed waste avoidance and minimisation in council procurements, specifically focusing on activities generating high volumes of waste.	WO5	WT1	1	1	1	1		1	1			1	1	1	1	1	1	1	1			1	1	71
2.7	**BROADEN ADVOCACY TO CENTRAL GOVERNMENT FOR TIMELY DELIVERY OF THE STATUTORY AND POLICY FRAMEWORK THAT WILL ENABLE THE SHIFT TO A CIRCULAR ECONOMY**																								

No	Description	Relevant Waste Objectives and Targets		Assessment criteria																					
		Objectives	Targets	Environmental benefits				Māori Outcomes		Social & cultural benefits				Operational benefits			Economic benefits					Deliverability and risk			Total score
Score				20%				10%		20%				15%			20%					15%			100%
Secondary score				5	5	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	4	5	5	5	100
Secondary Criteria No.				I	II	III	IV	I	II	I	II	IV	V	I	II	III	I	II	III	IV	V	I	II	III	
2.7a	Advocate for timely delivery of the goals and targets of the New Zealand Waste Strategy while extending advocacy for further regulatory settings that will drive waste avoidance, circularity of resources, and lower emissions across supply chains	WO1	WT4	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1				1	71
2.7b	Advocate for laws that require products to last longer and be easier to repair. Collaboration with repair organisations to support Aucklanders to keep products in use for longer.	WO1	WT4	1	1	1	1		1	1	1	1	1		1	1	1	1	1	1				1	71
2.7c	Advocate for a framework to reduce the unnecessary loss of surplus soil from construction activities into landfill, cleanfill and managed fill. Improve data and identification of different waste soil categories and their fate.	WO4	WT4	1	1	1		1	1					1	1	1		1	1	1	1		1		51
2.7d	Advocate for cross-government changes to create new economic policy that will support circularity of resources, waste avoidance and lower emissions across supply chains. (ie. how do we create a circular economy without other government departments being involved)	WO1	WT4	1	1	1	1	1	1	1	1				1	1		1	1	1				1	57
2.7e	Advocate for a coordinated national framework to enable greater transparency of hazardous waste management and disposal. Expand focus from household hazardous waste to industrial hazardous waste-generating activities and responsible management pathways in Auckland.	WO6, WO8	WT4		1	1	1		1	1	1	1		1	1	1		1				1	1	1	64
2.8	**PREPARING/PAVING THE WAY FOR BEYOND 2030**																								
2.8a	Investigate the potential role of emerging technologies to facilitate waste avoidance and minimisation.	WO3	WT4	1			1				1			1	1		1		1	1				1	42
2.8b	Undertake research on emerging waste topics and priority wastes which can be relied upon to inform evidence-based decision-making.	WO4	WT4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1					71
2.8c	Explore opportunities to optimise resource recovery options for biosolids, in collaboration with Watercare, iwi/Māori, and key stakeholders.	WO2, WO5, WO8	WT4	1	1		1	1	1	1					1		1		1	1		1	1	1	52

9 Preferred Option

Based on this assessment, the preferred option to take forward to the next WMMP is Option 2.

Option 2 involves completing the implementation of the 2018 WMMP (including eight additional Option 1 actions, for which there are budgets assigned under the Long-Term Plan), plus the addition of a further nineteen actions that expand the scope of the 2018 WMMP to reflect the broader priorities and national strategic policy direction as identified and discussed in this Waste Assessment. The priorities include actions that support developing a circular economy, reducing carbon emissions from waste, and prioritising actions higher up the waste hierarchy to reduce the need for the disposal of waste to landfill.

Option 2 does not require significant capital or operational investment beyond existing business-as-usual budgets, and all actions were assessed as having the potential to generate numerous benefits and community outcomes. The actions rely on council capability and resourcing, alongside collaborative efforts with external partners and stakeholders. Scheduling the implementation of the various actions may be determined through a future process which considers various criteria, including potentially prioritising those actions which achieved higher scores in this waste assessment. Should specific council-led research or advocacy actions lead on to identifying the need to implement new initiatives, separate business cases will be required.

Option 2 includes an accelerated focus on reducing waste from C&D activities, both on Auckland Council Group projects and within the wider industry, including soil management, the reduction of soils to Class 1 landfills, and advocating for increased regulation and reporting around C&D waste streams. As this is beyond the council's direct influence, support from and collaboration with the private sector is necessary. Similarly, the council will seek to work alongside iwi and community groups to target these areas for waste minimisation.

Specific actions targeting the upper tiers of the waste hierarchy as well as those focused on specific waste materials (including organics, plastics, biosolids, textiles, nappies and sanitary products) are included based on the evidence gathered in this waste assessment which indicate an increased priority since 2018.

Option 2 also recognises the future needs of Auckland's diverse population and the increased intensification of housing that requires alternative solutions to continue and improve on the diversion of waste from domestic households.

The release of the NZWS and anticipated legislation is a significant step nationally towards a low waste, low emission economy, however Council will continue to advocate for further regulation, particularly around the introduction of a CRS, mandatory product stewardship schemes, duty of care responsibilities, enforcement powers relating to litter and illegal dumping, and the tracking and treatment of hazardous wastes.

Option 2 continues to place a strong focus on the Auckland Council Group further reducing in-house and operational wastes. This offers benefits not only in terms of reduced tonnages to landfill, but also maintains integrity and makes use of the size and scale that the council organisation offers.

Many of the interventions that Waste Solutions has proposed in this Waste Assessment are based around a regenerative, inclusive economy for Aucklanders. To reduce emissions, and avoid and minimise waste, some economic activity will need to change. As the economy changes there will be the need to develop strong

strategy and policy to maintain support for Auckland communities of greatest need to participate and benefit from circular economy opportunities, as well as adapt to changing employment opportunities that can come with this transition.

Specific actions included within Option 2 will be further developed and assessed as part of the upcoming WMMP process. The results of the multi-criteria assessment and preliminary engagement provides a robust starting point for that next stage.

10 Early engagement

Staff have engaged with mana whenua, the waste industry, community partners and staff from across the Auckland Council Group to present, review and refine the draft waste assessment. There is no statutory requirement to engage with iwi/Māori or consult with stakeholders on the waste assessment, but council wishes to collaborate early where possible given council's commitment to partner with mana whenua on strategic planning function, as well as recognising the significant roles played by private and community sectors in Auckland's waste market. Preliminary engagement with mana whenua will lead to further discussion as part of the development of the next WMMP. Initial engagement with industry and other key community stakeholders forms part of council's collaborative approach.

This preliminary engagement is intended to ensure that issues and constraints are well understood, and to gain a strong level of support moving forward.

Engagement on the WMMP including the Hauraki Gulf Islands Waste Plan was also undertaken in late 2022 and 2023 with mana whenua, community groups and partners, and elected members.

A summary of the Māori and community engagement activities and feedback themes for the region-wide WMMP is outlined in Appendix K. The insights from engagement have informed the strategic content including principles, goals and objectives recommended for the WMMP; and further engagement will contribute to finalising the content for the draft WMMP.

11 Statement of proposal

The council proposes that the WMMP be for a six-year term. The actions contained with the Option 2 (the preferred option), as outlined in Chapter 8, are recommended to help the council meet future demand for waste management and minimisation services.

Implementation of Option 2 is expected to meet forecast demand for services (as outlined in Chapter 6) and support the council's goals and objectives for waste management and minimisation (refer Chapter 7).

This will be confirmed as part of the development and adoption of the WMMP during 2023-24.

12 Statement of public health protection

The wide range of waste services available in the Auckland region as provided by the council or by private industry (detailed in Chapter 5) will ensure that public health is adequately protected in the future. The Auckland region has access to safe and sanitary landfills that meet national legislative requirements.

Services for achieving waste minimisation will be further improved on, and alternatives to landfill considered, and will be incorporated into the WMMP.

There is adequate access to council and private refuse, hazardous waste and illegal dumping/ litter collection services, although further service improvements and waste minimisation are achievable.

The Medical Officer of Health has been consulted in the development of the Waste Assessment and their review is included in Appendix L. The review expressed overall support for the proposed approach and adopting Option 2 and reflected that complaints to the National Public Health Service-Northern Region about waste collection and landfill management are uncommon. Some of the concerns raised include:

- ensuring that council planning and resource consent processes do not create or exacerbate community disadvantage in the location of facilities that produce or process waste
- the increasing problem of disposable (non-degradable) nappies and related products, which should be a priority for addressing once the kerbside food scraps collection service is implemented
- a long-term concern about scrap metal and the health risk from toxic smoke from fires in scrap metal yards
- support for Auckland Council's advocacy for improving the national policy, regulation and resourcing to address the fragmented framework for managing hazardous wastes
- the health impacts of asbestos waste from construction and demolition
- problematic levels of contaminants in biosolids (in relation to re-use options) due to limited separation of trade waste and other contaminant sources in Auckland.

They would like to see:

- greater links between Auckland Council and Te Whatu Ora services in the Auckland region on health service waste minimisation and management
- Auckland Council's involvement in developing innovative methods to reduce waste in conjunction with research organisations and companies
- emphasis on ensuring environmental health justice for local communities in the location and operation of facilities where waste is generated, stored, processed, recovered, recycled and disposed of, through the planning system
- opportunities for greater environmental health gain from shifting responsibilities and costs towards those who generate waste rather than emphasizing consumer responsibility.

This valuable feedback has been incorporated into the principles and actions within the draft WMMP 2024.

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14 Key terms

Auckland Council: The unitary authority created by the Local Government (Auckland Council) Act 2009, which combines the functions of the seven former territorial authorities (territorial authorities) with that of the former Auckland Regional Council.

Auckland region: For the purposes of this waste assessment, equivalent to the area covered by Auckland Council.

Biosolids: Sewage or sewage sludge derived from a sewage treatment plant that has been treated and/or stabilised to the extent that it is able to be safely and beneficially applied to land

Clean fill site: Land that is used for the disposal of clean fill material. Technical term is 'Class 4 Landfill'[73]

Clean fill material: Material that when discharged to the environment will not have a detectable effect relative to the background and comprising virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- combustible, putrescible, degradable or leachable components
- hazardous substances or materials (such as municipal solid waste) likely to
- create leachate by means of biological breakdown
- any products or materials derived from hazardous waste treatment
- stabilisation or disposal practices
- materials such as medical and veterinary waste, asbestos, or radioactive
- substances that may present a risk to human health if excavated
- contaminated soil and other contaminated materials
- liquid waste.

C&D landfill: A site that accepts construction and demolition (C&D) waste

C&D waste: Construction and demolition waste generated from the building and/or removal of any structure or including infrastructure c; and includes any concrete, plasterboard, wood, steel, brick, cardboard, metals, plastic, glass or rubble.

Circular economy: A circular economy is an alternative to the traditional linear economy in which we keep resources in use for as long as possible, extract the maximum value from them whilst in use, then recover and regenerate products and materials at the end of each service life.[74]

Disposal: Has the meaning given by the Waste Minimisation Act 2008.

[73] Definition adopted from the Technical Guidelines for the Disposal to Land of Residual Waste and Other Material (Land Disposal Technical Guidelines), Waste Management Institute New Zealand (WasteMINZ), 2016
[74] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/ohanga-amiomio-circular-economy/

1. In this Act, unless the context requires another meaning, disposal means—
    a. the final (or more than short-term) deposit of waste into or onto land set apart for that purpose; or
    b. the incineration of waste.
    c. In subsection (1)(a), for all purposes relating to the levy, final (or more than short-term) deposit of waste means any deposit of waste other than a deposit referred to in section 26(3).
    d. In subsection (1)(b), incineration means the deliberate burning of waste to destroy it, but not to recover energy from it.

Diverted material: Anything no longer required for its original purpose and, but for commercial or other waste minimisation activities, would be disposed of or discarded.

Domestic waste: Waste from domestic activity in households.

Electronic waste or E-waste: Any equipment, device or thing, the operation of which is in some way dependent on, or designed for the generation, transfer or measurement of, an electric current and/or an electromagnetic field and designed for a supply voltage not exceeding 1000 volts for alternating current and 1500 volts for direct current; and that is disposed of.

ETS: Emissions Trading Scheme. Under the New Zealand Emission Trading Scheme (NZ ETS), landfills subject to the waste levy are required to surrender emission units to cover their methane emissions.

Landfill: Any site that accepts municipal solid waste (MSW), generally also accepts C&D waste, some industrial wastes, and contaminated soils. MSW landfills often use clean fill material and controlled/managed fill material as daily cover. Referred to in this document as a 'sanitary landfill'. Technical term is 'Class 1 Landfill - Municipal Solid Waste Landfill or Industrial Waste Landfill' [75]

Food scraps: Domestic waste derived from any item of food and is organic in origin and includes fruit and vegetable scraps, meat, fish and bone discards, and any other similar food waste.

Green waste: Vegetative garden waste material including:

- grass clippings
- branches
- weeds
- leaves.

Hazardous substance: Means, unless expressly provided otherwise by regulations, any substance:

1. with 1 or more of the following intrinsic properties:
    a. explosiveness

[75] Definition adopted from the Technical Guidelines for the Disposal to Land of Residual Waste and Other Material (Land Disposal Technical Guidelines), Waste Management Institute New Zealand (WasteMINZ), 2016

b. flammability
c. a capacity to oxidise
d. corrosiveness
e. toxicity (including chronic toxicity)
f. ecotoxicity, with or without bioaccumulation; or

2. which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any 1 or more of the properties specified in paragraph (a) ·
3. which on contact with air or water (other than air or water where the temperature or pressure has been artificially increased or decreased) generates a substance with any 1 or more of the properties specified in paragraph (a)

Hazardous waste: Means waste that

1. contains hazardous substances at sufficient concentrations to exceed the minimum degrees of hazard specified by Hazardous Substances (Minimum Degrees of Hazard) Regulations 2000 under the Hazardous Substances and New Organism Act 1996; or
2. meets the definition for infectious substances included in the Land Transport Rule: Dangerous Goods 1999 and NZ Standard 5433: 1999 – Transport of Dangerous Goods on Land; or
3. meets the definition for radioactive material included in the Radiation Protection Act 1965 and Regulations 1982; or

It does not include domestic waste, commercial-domestic waste, inorganic material, construction and demolition waste or commercial waste.

Local Government Act 2002: Local Government Act 2002, amended to Local Government Act 2002, Amendment Act 2014

Managed/controlled fill: Material that when discharged to the environment will not have a detectable effect relative to the background and comprising virgin excavated natural materials (VENM) such as clay, soil and rock that are free of:

- combustible, putrescible, degradable or leachable components;
- hazardous substances or materials (such as municipal solid waste) likely to create leachate by means of biological breakdown
- any products or materials derived from hazardous waste treatment
- stabilisation or disposal practices
- materials such as medical and veterinary waste, asbestos, or radioactive
- substances that may present a risk to human health if excavated
- contaminated soil and other contaminated materials
- liquid waste.

The alternative Auckland Plan definition: Cleanfill type material but where the material may include soils which exceed permitted activity contaminant concentrations that will not result in any significant adverse effect on human health, surface water or groundwater quality, including potable water sources.

Managed/controlled fill site: Sites where managed fill material is accepted for disposal. Technical term is 'Class 3 Landfill - Managed/Controlled Fill'

Product Stewardship: When a producer, brand owner, importer, retailer or consumer accepts responsibility for reducing a product's environmental impact[76]. Sometimes known as 'extended producer responsibility'.

Reprocessing: Refers to the process of treating or refining used products in order to recover valuable materials, reduce waste and create new usable materials.

Resource Recovery Network: A region-wide network of community recycling centres and other facilities that enable diversion of waste from landfill.

Reuse: The repeated or continual use of products or components in their existing form, for the same purpose for which they were originally conceived, without the need for significant alteration, thereby extending the lifespan of those products or components and replacing the need for new products or components. To be reused, products or components may or may not require preparation for reuse between uses.

Special wastes: Materials disposed to landfill which require specific treatment and/or handling prior to disposal, due to potentially hazardous properties. e.g. contaminated soils, sewage sludge, medical wastes.

Waste (according to the Waste Minimisation Act 2008):

1. anything disposed of or discarded; and
2. includes a type of waste that is defined by its composition or source (for example, organic waste, electronic waste, or construction and demolition waste); and
3. to avoid doubt, includes any component or element of diverted material, if the component or element is disposed of or discarded.

Waste Assessment: As defined by s51 of the Waste Minimisation Act 2008.A waste assessment must be completed whenever a WMMP is reviewed.

Waste Bylaw: In the context of this document means the 2019 Auckland Council Solid Waste Bylaw.

Waste oil (also referred to as used oil): Any oil that has been refined from crude oil, or any synthetic hydrocarbon oil, that has been used, and because of such use, has become unsuitable for its original purpose due to the presence of impurities or contaminants or the loss of original properties.

[76] https://environment.govt.nz/what-government-is-doing/areas-of-work/waste/product-stewardship/about-product-stewardship-in-new-zealand/

15 Acronyms

AD	Anaerobic digestion
AHP	Absorbent hygiene products
B2B	Business to business
C&D	Construction and Demolition
CCOs	Council-controlled organisations
CO_2	Carbon dioxide
CO_2-e	CO_2 equivalent
CRC	Community Recycling Centre
ERP	Emissions Reduction Plan
ETS	Emissions Trading Scheme
GDP	Gross Domestic Product
GHG	Greenhouse gas emissions
GWP	Global warming potential
HDPE	High density polyethylene (#2)
HFC	Hydrofluorocarbons
MBIE	Ministry for Business, Innovation and Employment
MfE	Ministry for the Environment
MGB	Mobile garbage bins, often known as wheelie bins
MRF	Materials Recovery Facility
MSW	Municipal Solid Waste
MUD	Multi Unit Development
NGO	Non-governmental organisation
NWDF	National Waste Data Framework
NZWS	New Zealand Waste Strategy
PET	Polyethylene terephthalate (#1)
PP	Polypropylene (#5)
RRN	Resource Recovery Network

RTS Refuse Transfer Station

SWAP Solid Waste Analysis Protocol

TA Territorial authority (a city or district council)

WMA Waste Minimisation Act 2008

WMMP A waste management and minimisation plan as defined in s43 of the Waste Minimisation Act 2008.

WtE Waste to Energy

16 List of Appendices

All appendices are available under separate cover.

Appendix A: Auckland Council's written submission for the NZ Parliament on the increase and expansion of the waste levy to reduce waste flowing to landfill, February 2020

Appendix B: SWAPS:

- B.1 Audit of Kerbside Rubbish in Central Auckland and Manukau, May 2023
- B.2 ICBD Recycling Audit Report, Nov 2022
- B.3 ICBD Waste Audit Report, July 2023
- B.4 Multi-Unit Dwelling Waste Audit Report, Feb 2023
- B.5 Contamination Audit Results, April 2021

Appendix C: Waste to Energy: Waste-to-Energy technologies: applications and implications for Tāmaki Makaurau, August 2023

Appendix D: Construction and Demolition Waste research

Appendix E: Tāmaki Makaurau Auckland Waste Soil Assessment 2017-2022

Appendix F: Mapping Auckland's Food System – Towards quantification of flows, waste, loss and greenhouse gas emissions, August 2023

Appendix G: B2B reusable packaging infrastructure and reverse logistics in Auckland, August 2023

Appendix H: Resource Recovery

- H.1 Eunomia Plastics Recovery Assessment
- H.2 Recyclables, Reuse, Processing and End Markets Issues Paper

Appendix I: Fashion Clothing Consumption and Waste Flows in the Auckland Region – Towards understanding textile waste and consumption streams, September 2023

Appendix J: Walking the Talk: Reducing Council's own in-house waste, 2023

Appendix K: Early Engagement and Feedback

Appendix L: Medical Officer of Health, Public Health Review of Auckland's Waste Assessment 2023, 8 November 2023